Aspire Z5700/Z5710 Series
Service Guide

Service guide files and updates are available on the ACER/CSD web; for more information, please refer to http://csd.acer.com.tw

PRINTED IN TAIWAN

Revision History

Please refer to the table below for the updates made on this service guide.

Date	Chapter	Updates

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Conventions

The following conventions are used in this manual:

SCREEN MESSAGES	Denotes actual messages that appear on screen.
NOTE	Gives bits and pieces of additional information related to the current topic.
WARNING	Alerts you to any damage that might result from doing or not doing specific actions.
CAUTION	Gives precautionary measures to avoid possible hardware or software problems.
IMPORTANT	Reminds you to do specific actions relevant to the accomplishment of procedures.

NOTE: This symbol where placed in the Service Guide designates a component that should be recycled according to the local regulations.

Preface

Before using this information and the product it supports, please read the following general information.

1. This Service Guide provides you with all technical information relating to the BASIC CONFIGURATION decided for Acer's "global" product offering. To better fit local market requirements and enhance product competitiveness, your regional office MAY have decided to extend the functionality of a machine (e.g. add-on card, modem, or extra memory capability). These LOCALIZED FEATURES will NOT be covered in this generic service guide. In such cases, please contact your regional offices or the responsible personnel/channel to provide you with further technical details.
2. Please note WHEN ORDERING FRU PARTS, that you should check the most up-to-date information available on your regional web or channel. If, for whatever reason, a part number change is made, it will not be noted in the printed Service Guide. For ACER-AUTHORIZED SERVICE PROVIDERS, your Acer office may have a DIFFERENT part number code to those given in the FRU list of this printed Service Guide. You MUST use the list provided by your regional Acer office to order FRU parts for repair and service of customer machines.

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System Specifications

Features

Below is a brief summary of the computer's many features:

Operating system

- Genuine Windows® 7 Home Premium (Touch Pack)

Processor

Z5710

- Intel® Core™ i7-860/i7-870 processor (8 MB L3 cache, 2.80/2.93 GHz, with Turbo Boost up to 3.46/3.60 GHz, DDR3 1066 MHz, 95 W), supporting Intel® EM64T Technology, Intel® Virtualization Technology
- Intel® Core™ i5-750 processor (8 MB L3 cache, 2.66 GHz with Turbo Boost up to 3.20 GHz, DDR3 1333 MHz, 95 W), supporting Intel® EM64T Technology, Intel® Virtualization Technology

Z5700/Z5710

- Intel® Core™ i5-650/i5-660/i5-670 processor (4 MB L3 cache, 3.20/3.33/3.46 GHz, DDR3 1333 MHz, 73 W), supporting Intel® EM64T Technology, Intel® Virtualization Technology, Intel® HD graphics
- Intel® Core™ i5-661 processor (4 MB L3 cache, 3.33 GHz, DDR3 1333 MHz, 87 W), supporting Intel® EM64T Technology, Intel® Virtualization Technology, Intel® HD graphics
- Intel® Core™ i3-530/i3-540 processor (4 MB L3 cache, 2.93/3.06 GHz , DDR3 1333 MHz, 73 W), supporting Intel® EM64T Technology, Intel® Virtualization Technology, Intel® HD graphics
- Intel® Pentium® processor G6950 (3 MB L3 cache, 2.80GHz, DDR3 1066 MHz, 73W) supporting Intel® EM64T Technology, Intel® Virtualization Technology

Chipset

- Intel® H57 Express Chipset

Memory

- Dual-channel DDR3 1066/1333 MHz SDRAM support:
  - Up to 2 GB per memory module
  - Upgrade option with four unbuffered DIMM slots

Graphics

Z5710

- NVIDIA® GeForce® G210M with 512 MB of dedicated DDR3 VRAM, supporting NVIDIA® CUDA™, PhysX™, PureVideo® HD technology, OpenEXR High Dynamic-Range (HDR) technology, Shader Model 4.0, Microsoft® DirectX® 10.1, OpenGL® 3.0
- NVIDIA® GeForce® GT240M with 1 GB of dedicated DDR3 VRAM, supporting NVIDIA® CUDA™, PhysX™, PureVideo® HD technology, OpenEXR High Dynamic-Range (HDR) technology, Shader Model 4.0, Microsoft® DirectX® 10.1, OpenGL® 3.0
- Dual independent display support
- 16.7 million colors
- External resolution / refresh rates:
  - VGA port up to 2048 x 1536: 85 Hz
  - HDMI™ port up to 1920 x 1200: 60 Hz
- MPEG-2/DVD, MPEG-4 decoding
- WMV9 (VC-1), H.264 (AVC), DivX® decoding
- HDMI™ (High-Definition Multimedia Interface) with HDCP (High-bandwidth Digital Content Protection) support

Z5700

- Intel® HD Graphics with 1.70 GB of video memory, featuring:
  - Intel® Clear Video HD Technology, DVD upscaling
  - MPEG-2, VC-1, AVC/H.264 decoding
  - De-interlacing, sharpness detail, noise reduction, Film Mode detection, video scaling, panel scalar
  - Microsoft® DirectX® 10 support
  - Intel® Dynamic Video Memory Technology 5.0 (Intel® DVMT 5.0) support
  - VGA port resolution / refresh rate up to 2560 x 1600: 60 Hz4

Display

- 23" Full HD 1920 x 1080 pixel resolution, high brightness (300-nit), TFT LCD
- 16:9 aspect ratio
- 5 ms response time
- 16.7 million colors
- 1000:1 (ACM) contrast ratio

Touchscreen

- Integrated Windows® 7 compliant multi-touch capable optical solution

Hard drive

Hard disk drive

- 500/640/750 GB / 1 TB 7200 RPM
- 1/1.5/2 TB 5400 RPM

Solid state drive

- 80 GB (optional)

Optical drive

4X Blu-ray Disc™ Reader / DVD-Super Multi double-layer drive:

- Read: 48X CD-ROM, 48X CD-R, 48 CD-RW, 16X DVD-ROM, 16X DVD-R, 16X DVD+R, 8X DVD-ROM DL, 8X DVD-R DL, 8X DVD+R DL, 8X DVD-RW, 8X DVD+RW, 12X DVD-RAM, 6X BD-ROM, 6X BD-R, 2X BD-RE, 6X BD-ROM DL, 2X BD-R DL, 2X BD-RE DL
- Write: 48X CD-R, 10X CD-RW, 16X DVD-R, 16X DVD+R, 16X DVD-RW, 16X DVD+RW, 5X DVD-RAM, 8X DVD+R DL, 8X DVD-R DL

8X DVD-Super Multi double-layer drive:

- Read: 48X CD-ROM, 48X CD-R, 48 CD-RW, 16X DVD-ROM, 16X DVD-R, 16X DVD+R, 8X DVD-ROM DL, 8X DVD-R DL, 8X DVD+R DL, 8X DVD-RW, 8X DVD+RW, 12X DVD-RAM
- Write: 48X CD-R, 10X CD-RW, 16X DVD-R, 16X DVD+R, 16X DVD-RW, 16X DVD+RW, 5X DVD-RAM, 8X DVD+R DL, 8X DVD-R DL

Card reader

- Multi-in-1 card reader, supporting:
  - MultiMediaCard (MMC)
  - Secure Digital™ (SD) Card / SDHC™ Card
  - Memory Stick™ / Memory Stick PRO Duo™ / Memory Stick PRO-HG Duo™

TV-tuner

Hybrid TV-tuner supporting worldwide analog/DVB-T (Digital Video Broadcasting-Terrestrial)

- TV-tuner I/O:
  - AIO platform
  - RF-in

Hybrid TV-tuner supporting worldwide analog and ATSC (Advanced Television Systems Committee)

- TV-tuner I/O:
  - AIO platform
  - RF-in

Digital TV-tuner supporting ISDB-T/BS/CS

- TV-tuner I/O:
  - Tower platform
  - RF-in

Hybrid TV-tuner supporting DMB-T/H (Digital Multimedia Broadcast-Terrestial/Handheld)

- TV-tuner I/O:
  - AIO platform
  - RF-in

Audio

- Integrated 5 W stereo speaker system
- High-definition audio support

Communication

- WLAN:
  - 802.11 b/g Wi-Fi CERTIFIED™
  - 802.11 b/g/n Wi-Fi CERTIFIED™
- WPAN:
  - Bluetooth® 2.1 + EDR
- LAN:
  - Gigabit Ethernet
- Built-in 1 MP high-def webcam with 1280 x 800 resolution image capture
- Built-in microphone

I/O ports

Side:

- Multi-in-1 card reader
- Two USB 2.0 ports
- High-definition headphone and microphone jacks
- Ambient light switch
- BCAS card Reader Slot (Japan only)

Rear:

- Four USB 2.0 ports
- Audio
  - Headphone/speaker/line-out jack
  - Microphone-in jack
  - Line-in jack
- Video
  - HDMI™ port with HDCP support
- Communication
  - Ethernet (RJ-45) port
- TV-tuner
  - IR blaster port (bundled with TV-tuner card)
  - TV-tuner port (bundled with TV-tuner card)

Power Supply Unit

- Adapter
  - 250 W

Software

- Productivity:
  - Acer Touch Suite
  - Adobe® Reader®
  - eSobi™
  - Microsoft® Office 2007 Trial with Microsoft® Works
  - Microsoft® Touch Pack (Microsoft® Surface Globe/Microsoft® Surface Collage/Microsoft® Surface Lagoon/Microsoft® Blackboard/Microsoft® Rebound/ Microsoft® Garden Pond)
- Multimedia:
  - CyberLink® PowerCinema®
  - CyberLink® YouCam®
- Security:
  - McAfee® Internet Security Suite 2009 Trial9
  - MyWinLocker®
- Entertainment
  - Oberon TouchGames
- Utilities
  - Acer eRecovery Management

Security

- Kensington lock slot
- Hardware and BIOS passwords

Dimensions and Weight

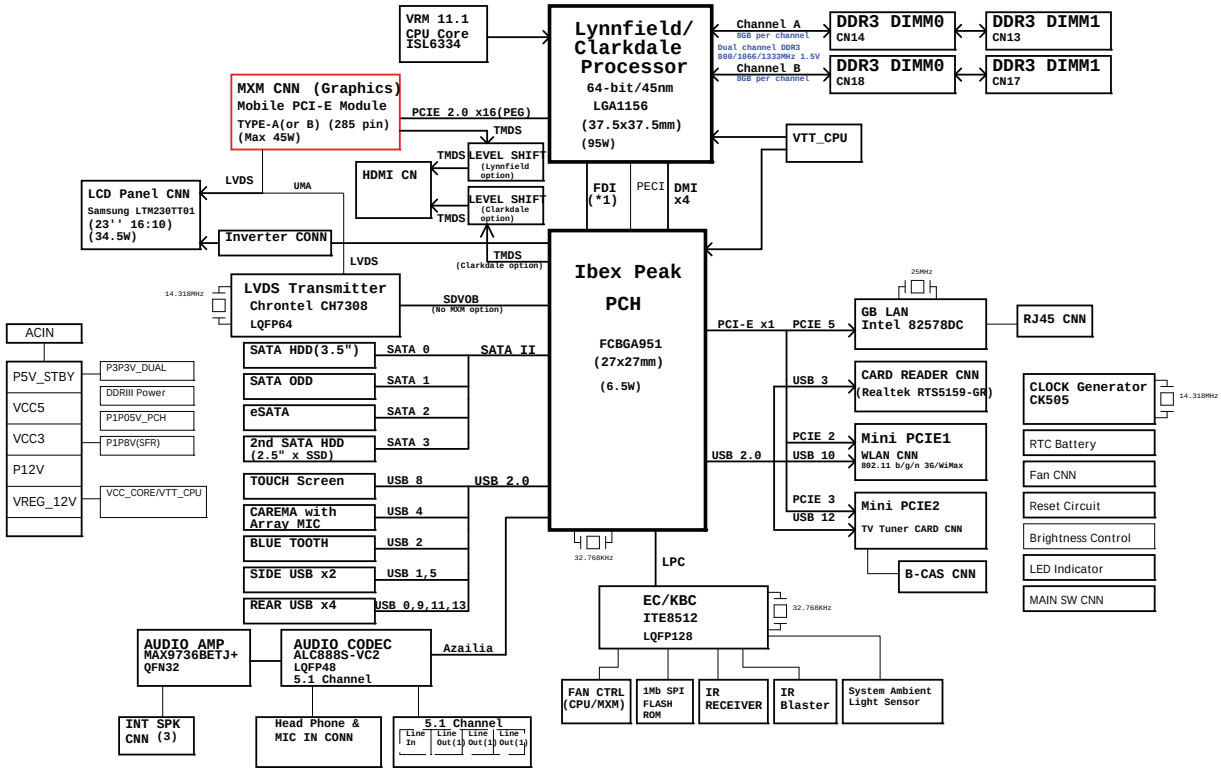
- 570 (W) x 484.0 (H) x 84.6 (D) mm

System Compliance

- PC 2001
- ENERGY STAR®

NOTE: The specifications listed above are for reference only. The exact configuration of your PC depends on the model purchased.

System Block Diagram



Your Computer tour

This section describes port locations, indicators, and controls for the computer.

IMPORTANT: Your computer's hardware options, port locations, and indicators may vary from this illustration.

Front View

No.	Component	Icon	Description
1	Microphone		Use to talk through when making Voice over Internet Protocol (VoIP) calls.
2	HD webcam		Use to let others see who they are communicating with when making VoIP calls.
3	Display screen		Also called Liquid-Crystal Display (LCD), displays computer output.
4	Acer TouchPortal		Access and control some of the handy features of your new computer.
5	Power Button		Press this button to turn the power on or off. You can also configure the power button to operate in Standby/Resume mode or Hibernate mode.

Right View

IMPORTANT: Your computer's hardware options, port locations, and indicators may vary from this illustration.

No.	Component	Icon	Description
1	Headphone jack (white plug)		Plug powered, analog front speakers, an external amplifier, or headphones into this jack.
2	Microphone jack (pink plug)		Plug a microphone into this jack.
3	Illumination Toggle Switch		
4	Memory card reader		Insert a memory card from a digital camera, MP3 player, PDA, cellular telephone, or other device into the memory card reader.
5	Optical Disk Drive		Use this drive to listen to audio CDs, install games and programs, watch DVDs, and store large files onto recordable discs (depending on drive type). This drive may be a CD, recordable CD, DVD, or recordable DVD.

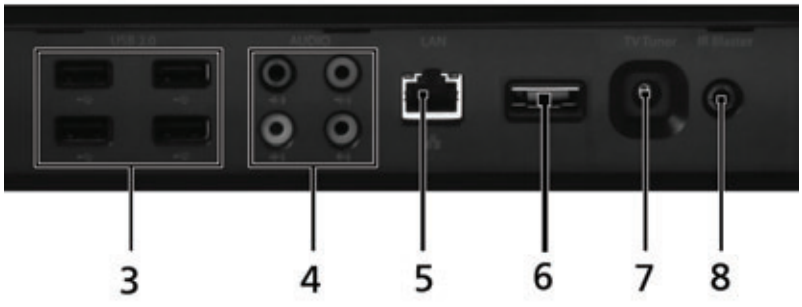
Left View

IMPORTANT: Your computer's hardware options, port locations, and indicators may vary from this illustration.

No.	Component	Icon	Description
1	B-CAS reader		Subscription service available for select models only.
2	USB 2.0 port		Plug USB (Universal Serial Bus) devices (such as a USB external drive, printer, scanner, camera, keyboard, or mouse) into this port.

Rear View

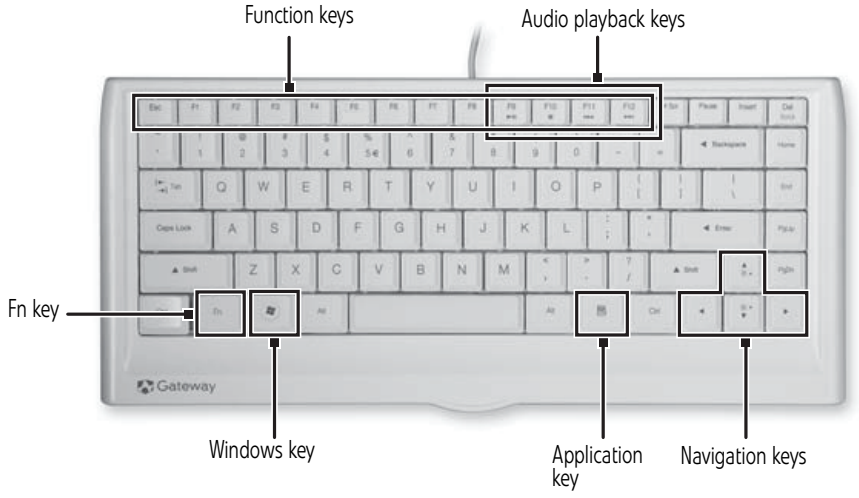
IMPORTANT: Your computer's hardware options, port locations, and indicators may vary from this illustration.



No.	Component	Icon	Description
1	Power connector		Plug the power cord into this connector.
2	Kensington™ lock slot		Secure your computer to an object by connecting a Kensington cable lock to this slot.
3	USB ports		Plug USB (Universal Serial Bus) devices (such as a USB printer, scanner, camera, keyboard, or mouse) into these ports.
4	Ethernet (network) jack		Plug an Ethernet network cable or a device (such as a DSL or cable modem for a broadband Internet connection) into this jack.
5	Line-out/Speaker-out jack		Plug an line output to an amplifier or entertainment system into this jack for sound output.
6	eSATA port		Plug external hard drives into this connector.
7	TV Tuner		Allows a TV Tuner to be connected to the system.
8	IR port		Allows data transfer between the desktop and a mobile device.

Using the Keyboard

The keyboard has several different types of keys and buttons as shown below.



Feature	Icon	Description
Function keys		Press these keys to start program actions. Each program uses different function keys for different purposes. See the program documentation to find out more about the function key actions.
Audio playback keys		Press these keys to play your audio files and to adjust the volume.
Windows key		Press this key to open the Windows Start menu. This key can also be used in combination with other keys to open utilities. See “Windows Keys” on page 12.
Fn key		Press this key in combination with keys that have alternate functions defined, such as the **F9**-**F12** keys. Press <**Fn**> + <△> to increase the brightness of the display. Press <**Fn**> + <▽> to decrease the brightness of the display.
Application key		Press this key to access shortcut menus and help assistants in Windows.
Navigation keys		Press these keys to move the cursor and to copy, cut, and paste objects.

Windows Keys

The keyboard has two keys that perform Windows-specific functions.

Key	Description
Windows key	Pressed alone, this key has the same effect as clicking on the Windows Start button; it launches the Start menu. It can also be used with other keys to provide a variety of functions: <**>**:** Open or close the Start menu <**>** **+ <D>:** Display the desktop <**>** **+ <E>:** Open Windows Explore <**>** **+ <F>:** Search for a file or folder <**>** **+ <G>:** Cycle through Sidebar gadgets <**>** **+ <L>:** Lock your computer (if you are connected to a network domain), or switch users (if you're not connected to a network domain) <**>** **+ <M>:** Minimizes all windows <**>** **+ <R>:** Open the Run dialog box <**>** **+ <T>:** Cycle through programs on the taskbar <**>** **+ <U>:** Open Ease of Access Center <**>** **+ <X>:** Open Windows Mobility Center <**>** **+ <BREAK>:** Display the System Properties dialog box <**>** **+ <SHIFT+M>:** Restore minimized windows to the desktop <**>** **+ <TAB>:** Cycle through programs on the taskbar by using Windows Flip 3-D <**>** **+ <SPACEBAR>:** Bring all gadgets to the front and select Windows Sidebar **<CTRL> +** <**>** **+ <F>:** Search for computers (if you are on a network) **<CTRL> +** <**>** **+ <TAB>:** Use the arrow keys to cycle through programs on the taskbar by using Windows Flip 3-D **Note:** Depending on your edition of Windows 7 some shortcuts may not function as described.
Application key	This key has the same effect as clicking the right mouse button; it opens the application's context menu.

Hardware Specifications and Configurations

Processor

Item	Specification
CPU type*	• Intel® Core2™ Duo processor • Intel® Core™2 Quad processor • Pentium® dual-core Processor *Dependent on model shipped.

Chipset

Item	Specification
Core logic	Ibex Peak package H57 • FCBGA package • Package size: 27mm x 27mm • Ball Count: 951 • Ball pitch: 0.7mm
Features	• PCI Express* Base Specification, Revision 2.0 support for up to eight ports. • PCI Local Bus Specification, Revision 2.3 support for 33 MHz PCI operations (supports up to four Req/Gnt pairs). • ACPI Power Management Logic Support, Revision 3.0b • Enhanced DMA controller, interrupt controller, and timer functions • Integrated Serial ATA host controllers with independent DMA operation on up to six ports. • FIS-based Port Multiplier support on SATA Ports 4 and 5 in AHCI/RAID mode. • USB host interface with support for up to fourteen USB ports; two EHCI high-speed USB 2.0 Host controllers, 2 rate matching hubs, seven UHCI host controllers; o Integrated 10/100/1000 Gigabit Ethernet MAC with System Defense • System Management Bus (SMBus) Specification, Version 2.0 with additional support for I2C devices • Supports Intel® High Definition Audio • Supports Intel® Matrix Storage Technology • Supports Intel® Active Management Technology • Supports Intel® Virtualization Technology for Directed I/O • Supports Intel® Trusted Execution Technology • Dual Channel NAND Interface supporting 1.8V ONFi* 2.0 compliant NAND • Supports buffered mode generating extra clocks from CK505 timer. • • Low Pin Count (LPC) interface • Firmware Hub (FWH) interface support • Serial Peripheral Interface (SPI) support • Intel® Quiet System Technology (Desktop only) • Intel® Anti-Theft Technology • Integrated TPM 1.2 • JTAG Boundary Scan support
CPU Package	• LGA1156
CPU Core Voltage	• 95W

Processor Specifications

Processor	CPU Speed	Cores	Bus Speed	Power	Cache Size	Package	Acer P/N
i3 530	2.93G	2	1333	73W	4M	FCBGA	KC.53001.CI3
i3 540	3.06G	2	1333	73W	4M	FCBGA	KC.54001.CI3
i5 650	3.2G	2	1333	73W	4M	FCBGA	KC.65001.CI5
i5 660	3.33G	2	1333	73W	4M	FCBGA	KC.66001.CI5
i5 661	3.33G	2	1333	73W	4M	FCBGA	KC.66101.CI5
i5 670	3.46G	2	1333	87W	4M	FCBGA	KC.67001.CI5
i5 750	2.66G	4	1333	73W	8M	FCBGA	KC.75001.CI5
i7 860	2.8G	4	1333		8M	FCBGA	KC.86001.CI7
i7 870	2.93G	4	1333		8M	FCBGA	KC.87001.CI7

BIOS

Item	Specification
BIOS vendor	American Megatrends
BIOS Version	3.0
BIOS ROM type	16Mbits, 8 pin SOIC package
Features	• PC/AT Compatible System BIOS. • ACPI 3.0 Compliance/Support, S0, S1, S3, S4, S5. • Boot Block Recovery mode from CD-ROM/USB FDD/USB CD-ROM/USB-DVD ROM/USB Disk-On-Key • Security Setting (Password on boot or Setup Menu). • BIOS update in DOS/Windows. • Quiet/Quick Boot. • Support SLP 1.0/2.1. • Support Power On by LAN/RTC. • Support Wake up by Keyboard/Mouse. • Support SMBIOS V2.6 • Support onboard Lan PXE boot • Support the restore on AC Power Loss. • Support intel turboot technology. • Support Intel Management Engine function. • Support CPU Hyper-Threading (HT)/Dual Core. • Support CPU Virtualization Technology (VT). • Support CPU Speedstep technology. • Support Lynnfiled/Clarkdale C state.

System Memory

Item	Specification
Memory controller	Built in
DIMM socket number	2
Supports memory size per socket	512/1024/2048MB (1 bank or 2 bank)
Supports maximum memory size	8192MB (4096MB+4096MB SO-DIMMs)
Supports DIMM type	2 DDR3 SO-DIMM
Supports DIMM Speed	800/1066/1333 MHz
Supports DIMM voltage	1.5V

Memory Combinations

Slot 1	Slot 2	Total Memory
0MB	1024MB	1024MB
0MB	2048MB	2048MB
0MB	4096MB	4096MB
1024MB	0MB	1024MB
1024MB	512MB	1536MB
1024MB	1024MB	2048MB
1024MB	2048MB	3072MB
2048MB	0MB	2048MB
2048MB	512MB	2560MB
2048MB	1024MB	3072MB
2048MB	2048MB	4096MB
4096MB	4096MB	8192MB

Above table lists some system memory configurations. You may combine DIMMs with various capacities to form other combinations. On above table, the configuration of slot 1 and slot 2 could be reversed.

USB Port

Item	Specification
Chipset	SB710 embedded
USB compliance level	2.0
OHCI	5 OHCI and 2 EHCI Host controllers
Number of USB port(s)	6
Location	2 left, 4 back

Wireless Module

Item		Specification
Model and Type		Lite-On WN6605LH-AA, Quanta EM307 WLAN EM307
Conformity		802.11 b/g/n WiMax
Modulation Technique		OFDM with BPSK QPSK, 16QAM, 64QAM (g/n), DQPSK, DBPSK and CCK (b)
Frequency Range		2412 ~ 2484MHz ISM band
Channels		1---14 channels for active channels
Data Rate (Mbps)		802.11b data rate: 11,5.5,2,1 Mbps with DBPSK and DQPSK modulation 802.11 g data rate: 54, 48, 36, 24, 18, 12, 9, 6Mbps
Security (WEP)		WPA, WPA2
Operating Temperature	Operating	-10°C to +75°C
	Storage	-40°C to +80°C

Touchscreen

Item	Specifications
Touchscreen	Windows 7 multitouch and gestures

Hard Disk Drive Interface

Item	Specifications			
Vendor & Model Name	Hitachi HDT721016SLxxx HCT721016SLxxx HDT721025SLxxx HCT721025SLxxx HDT721032SLxxx HCT721032SLxxx	Hitachi HDT721050SLxxx HCT721050SLxxx HDE721050SLxxx	Hitachi HDT721064SLxxx HCT721064SLxxx HDE721064SLxxx HDT721075SLxxx HCT721075SLxxx HDE721075SLxxx	Hitachi HDT721010SLxxx HCT721010SLxxx HDE721010SLxxx
Capacity (GB)	160, 160, 250, 250, 320, 320	500	640, 640, 640, 750, 750, 750,	1000
Bytes per sector	512			
Data heads	1, 1, 2, 2, 2, 2	3	6	6
Drive Format				
Disks	1	2	2	3
Spindle speed (RPM)	7200			
Performance Specifications				
Buffer size	8MB	8MB	16	32
Interface	SATA			
Internal transfer rate (MB/sec, max)	300MB/s maximum			
I/O data transfer rate (Mbytes/sec max)	1406 Mbits/s maximum			
DC Power Requirements				
Voltage	+5.0V ± 5%.			

Hard Disk Drive Interface (continued)

Item	Specifications		
Vendor & Model Name	Seagate ST31000528AS, ST3750528AS, ST3500418AS, ST3500410AS, ST3320418AS (Pharaoh)	Seagate ST3250318AS, ST3160318AS (Pharaoh)	Seagate ST9100822A, ST9808210A, ST960821A, ST950212A, ST9402113A, ST930219A (Momentus)
Capacity (GB)	1000, 750	250, 160	100, 80, 60, 50, 40, 30
Bytes per sector	512	512	512
Data heads	4	1	4, 3, 3, 2, 2, 2
Drive Format			
Disks	2, 2, 1, 1, 1	1	2, 2, 2, 1, 1, 1,
Spindle speed (RPM)	7200		5400
Performance Specifications			
Buffer size	32MB, 32MB, 16MB, 16MB, 16MB	8MB	8MB, 8MB, 8MB, 2MB, 2MB, 2MB
Interface	SATA		
Internal transfer rate (MB/sec, max)	300MB/s maximum		
I/O data transfer rate (Mbytes/sec max)	300		
DC Power Requirements			
Voltage	5V +10% / -7.5% -.12V +10% / -7.5%		

Hard Disk Drive Interface (continued)

Item	Specifications			
Vendor & Model Name	Western Digital, WD3200AAJS, WD2500AAJS, WD1600AAJS, WD800AAJS	Western Digital WD3200AAKS, WD2500AAKS, WD1600AAKS	Western Digital WD5000AAJS, WD6400AAJS	Western Digital WD5000AAKS, WD6400AAKS
Capacity (GB)	320, 250, 160, 80	320, 250, 160	500, 640	500, 640
Bytes per sector	512			
Data heads	2, 2, 1, 1	2, 2, 1	4	4
Drive Format				
Disks	1		2	
Spindle speed (RPM)	7200			
Performance Specifications				
Buffer size	8MB	16MB	8MB	16MB
Interface	SATA			
Internal transfer rate (MB/sec)	70MB/s sustained			
I/O data transfer rate (Mbytes/sec max)	3000 Mbits/s maximum			
DC Power Requirements				
Voltage	+5.0V ± 5%.and +12.0V ± 10%			

Video Interface

Item	Specification
Chipset	UMA: Ibex Peak H57
	Discrete: GT240M 1024MB DDR3 (N10P-GS) G210M 512MB DDR3(N10M-GS)
Package	FCBGA951
Interface	PCIE 2.0 x16

VRAM

Item	Specification
Chipset	Nvidia Geforce G210M
Memory size	Onboard 512MB memory; 64-bits memory interface
Interface	MXM 3.0

Audio Interface

Item	Specification
Audio Controller	Alc268 supporting Azalia function
Audio onboard or optional	Onboard
Mono or Stereo	Stereo
Internal Microphone	Headphone /Mic /line out support
Internal Speaker	5W Speakers 300Hz to 20kHz +/- 3dB

Keyboard Controller

Item	Specification
Controller	IT8512E/NX-L embedded
Total number of keypads	
Windows logo key	
Hotkeys	

Bluetooth

Item	Specification
Chipset	Broadcom BCM2046, Bluetooth2.1 + EDR, USB interface module
Data throughput	
Protocol	Bluetooth 2.1 + EDR
Connector type	USB

TV Tuner

Item	Specification
TV Tuner	• ATSC/QAM/HRC/IRC/Standard Cable • DVB-T • ISDB-T • DMB-T/H • Meets Microsoft Media Center TV Tuner requirements

VGA Controller

Item	Specifications

VGA Controller	• INTEL GL40/GM45 Internal Graphics
	  • Direct 3D, Integrated LVDS
	  • Dual view and Dual video
	  • TV-out
	• ATI M92-M

HDMI Port- Not available with this model

Item	Specification
Chipset	
Throughput	
Compliance level	

LCD 23”

Item	Specification		
Vendor/model name	Samsung LTM230HT01-A05 LTM230HT01		LG LM230WF1
Screen Diagonal (mm)	584.2		
Active Area (mm)	509.76 x 286.74		
Display resolution (pixels)	1920 x 1080		
Pixel Pitch	0.2655 x 0.2655		0.265 x 0.265
Display Mode	Normally White		
Typical White Luminance (cd/m^2) also called Brightness	300		
Supported Colors	16.7M		
Contrast Ratio	1000		
Response Time (Optical Rise Time/Fall Time) msec	5		1.3 / 3.7
Nominal Input Voltage VDD	5		
Interface	LVDS		
Viewing Angle (degree) Horizontal: Vertical:	80		
Temperature Range (°C)			
Operating Storage (shipping)	0 - 50 -25 - 60	0 - 35 5 - 35	0 - 50 -20 - 60

LCD Display Supported Resolution

Resolution	24 bits (UMA)	30 bits	36 bits (Discrete)	48 bits
800x600	Y	N	Y	N
1024x768	Y	N	Y	N
1152x864	Y	N	Y	N
1280x600	Y	N	N	N
1280x720	Y	N	Y	N
1280x768	Y	N	Y	N
1280x800	Y	N	Y	N
1280x960	Y	N	Y	N
1280x1024	Y	N	Y	N
1360x768	Y	N	Y	N

Resolution	24 bits (UMA)	30 bits	36 bits (Discrete)	48 bits
1366x768	Y	N	N	N
1400x900	Y	N	N	N
1400x1050	Y	N	N	N
1600x900	Y	N	Y	N
1600x1024	N	N	Y	N
1680x1050	Y	N	Y	N
1920x1080	Y	N	Y	N

Power Supply

Item	Specifications
AC Input	• Auto ranging from 100V to 240V and 50Hz to 60Hz
DC Output	• 5V, 40W; 3.3V, 19.8W; 12V, 174W; 12V, 6W, 5VSB, 10W • Uses 3 prong ICE-320-C13 or IEC-320-C5 connector for AC power • Hold up time of 16ms under maximum load • Meet <1W Standby Energy Star requirement for Desktop Category B • Meet EU Lot 6 requirement

RTC Battery

Item	Specifications
Lithium Rechargeable Battery	• Model: MIT CR2032 • Voltage:2.5-3.0V • Capacity: 210mAh • Vendor: Mitsubishi

AC Adaptor

Item	Specification
Input rating	AC 100V - 240V, 50/60Hz
Output	19V 135W
Maximum input AC current	
Inrush current	
Efficiency	

System Power Management

Item	Specification
Mech. Off (G3)	Al devices in the system are turned off completely.
Working (G0/S0)	Individual devices such as the CPU and hard disc may be power managed in this state.
Suspend to RAM (S3)	CPU set power down VGA Suspend PCMCIA Suspend Audio Power Down Hard Disk Power Down CD-ROM Power Down Super I/O Low Power mode
Save to Disk (S4)	Also called Hibernation Mode. System saves all system states and data onto the disc prior to power off the whole system.

System Utilities

BIOS Setup Utility

The BIOS Setup Utility is a hardware configuration program built into your computer's BIOS (Basic Input/ Output System).

Your computer is already properly configured and optimized, and you do not need to run this utility. However, if you encounter configuration problems, you may need to run Setup. Please also refer to Chapter 4 Troubleshooting when problem arises.

To activate the BIOS Utility, press **F2** during POST (when "Press <F2> to enter Setup" message is prompted on the bottom of screen).

Press <F12> during POST to enter multi-boot menu. In this menu, user can change boot device without entering BIOS SETUP Utility.

Navigating the BIOS Utility

There are six menu options: Information, Main, Advanced, Security, Boot, and Exit.

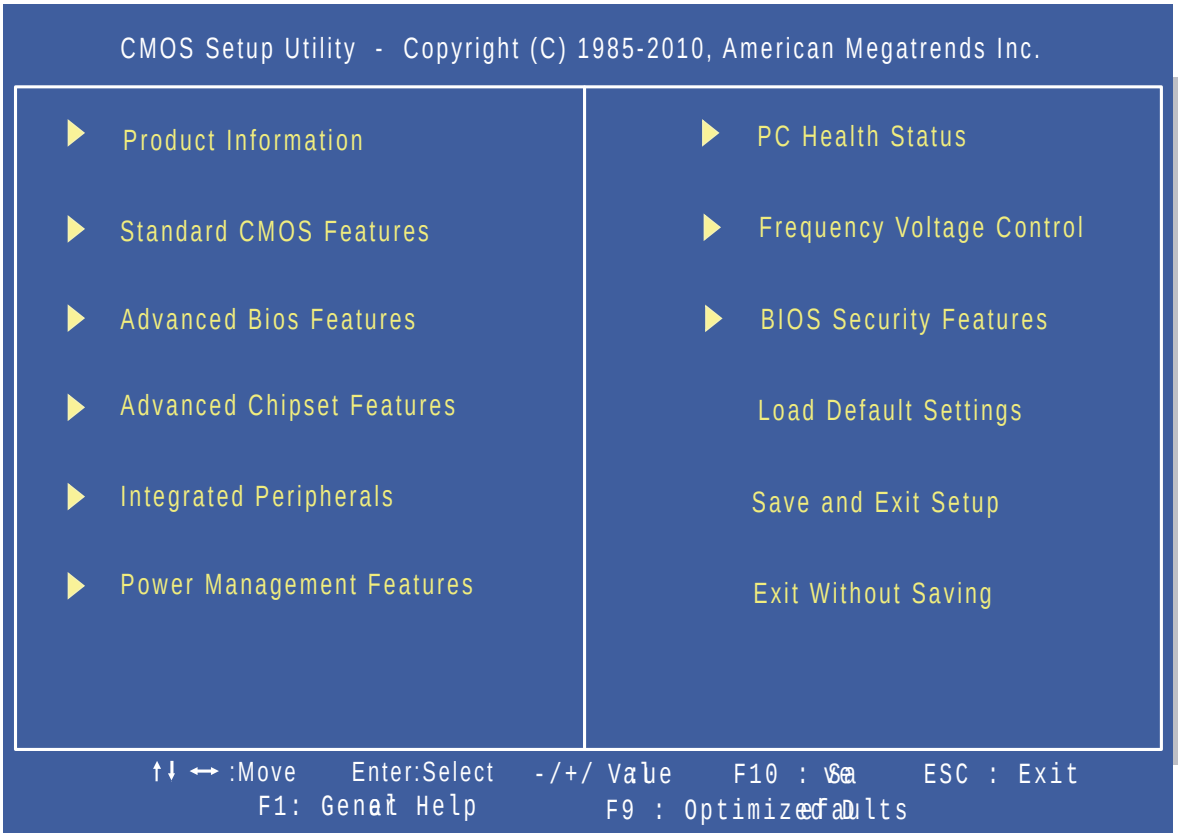
Follow these instructions:

- To choose a menu, use the left and right arrow keys.
- To choose an item, use the up and down arrow keys.
- To change the value of a parameter, press **F5** or **F6**.
- A plus sign (+) indicates the item has sub-items. Press **Enter** to expand this item.
- Press **Esc** while you are in any of the menu options to go to the Exit menu.
- In any menu, you can load default settings by pressing **F9**. You can also press **F10** to save any changes made and exit the BIOS Setup Utility.

NOTE: You can change the value of a parameter if it is enclosed in square brackets. Navigation keys for a particular menu are shown on the bottom of the screen. Help for parameters are found in the Item Specific Help part of the screen. Read this carefully when making changes to parameter values. **Please note that system information is subject to different models**.

CMOS Setup Utility

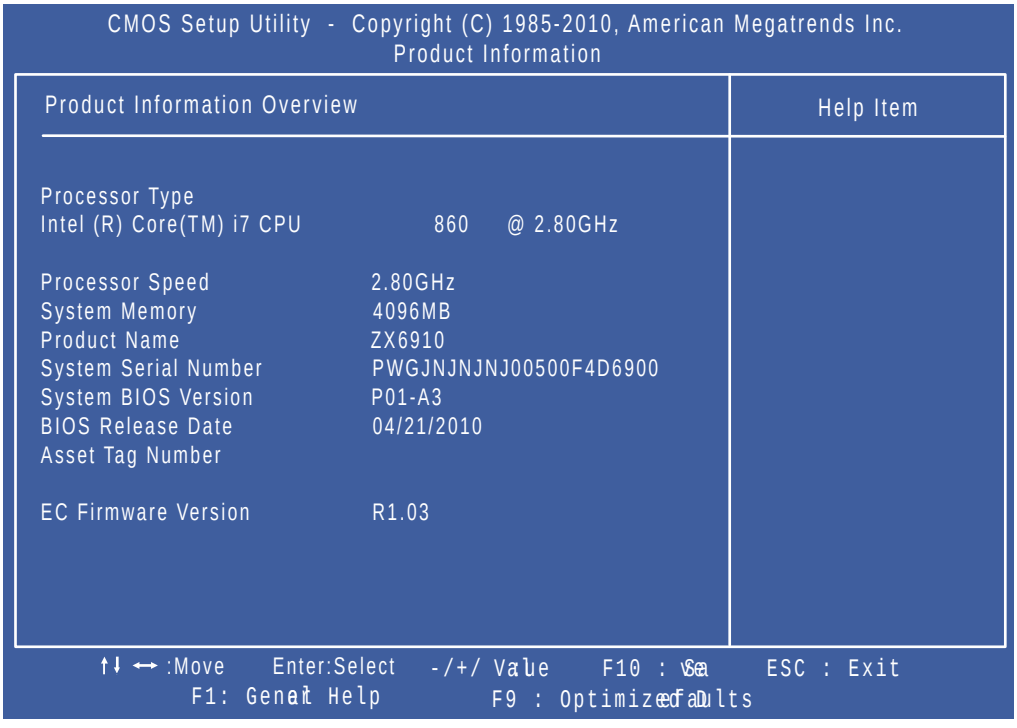
The CMOS Setup Utility screen displays a list of the functions and features available in the BIOS.



Use the arrow keys to scroll to the required menu and press Enter.

Product Information

The Product Information screen displays a summary of the computer hardware information.

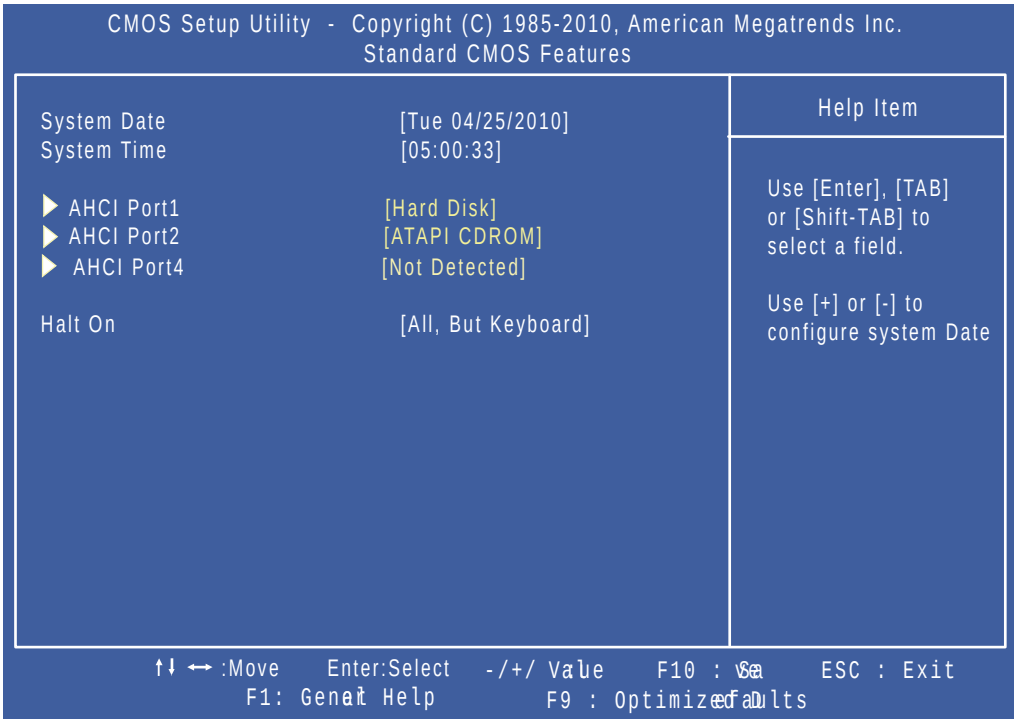


NOTE: The system information is subject to different models.

Parameter	Description
Processor Type	This field shows the system processor type.
Processor Speed	This field shows the speed of the processor.
System Memory	This field reports the memory size of the system.
Product Name	This field shows product name of the system.
System Serial Number	This field displays the serial number of this unit.
System BIOS Version	Displays system BIOS version.
BIOS Release Date	This field displays the release date of the system BIOS.
Asset Tag Number	This field displays the asset tag number.
EC Firmware Version	This field displays the EC Firmware version number.

Standard CMOS Features

The Standard CMOS Features screen allows the user to set the system time and date as well as set HDD and ODD options.



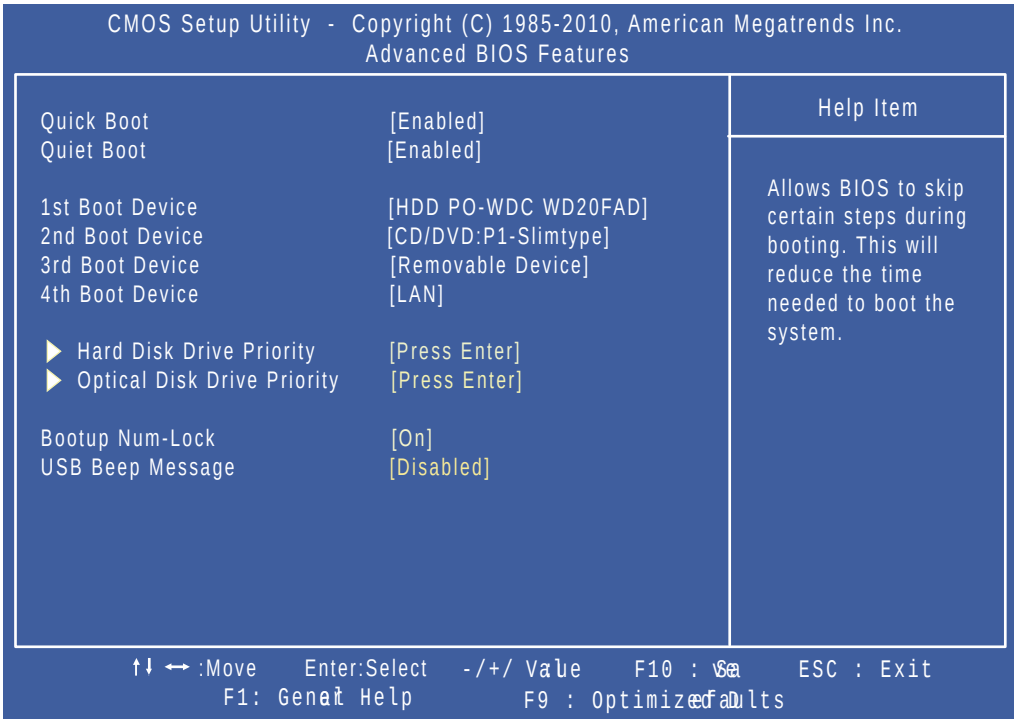
NOTE: The screen above is for your reference only. Actual values may differ.

The table below describes the parameters in this screen. Settings in **boldface** are the default parameter settings.

Parameter	Description	Format/Option
System Date	Sets the system date.	Format MM/DD/YYYY (month/ day/year)
System Time	Sets the system time. The hours are displayed with 24-hour format.	Format: HH:MM:SS (hour:minute:second)
SATA Port 1		
SATA Port 2		
AHCI Port 4		
Halt On	Instructs the BIOS to halt during boot up for the selected error parameter.	Options: • **All Errors** • **No Errors** • **All, But keyboard**

Advanced BIOS Features

The Advanced BIOS Features screen allows configuration of the various advanced BIOS options.

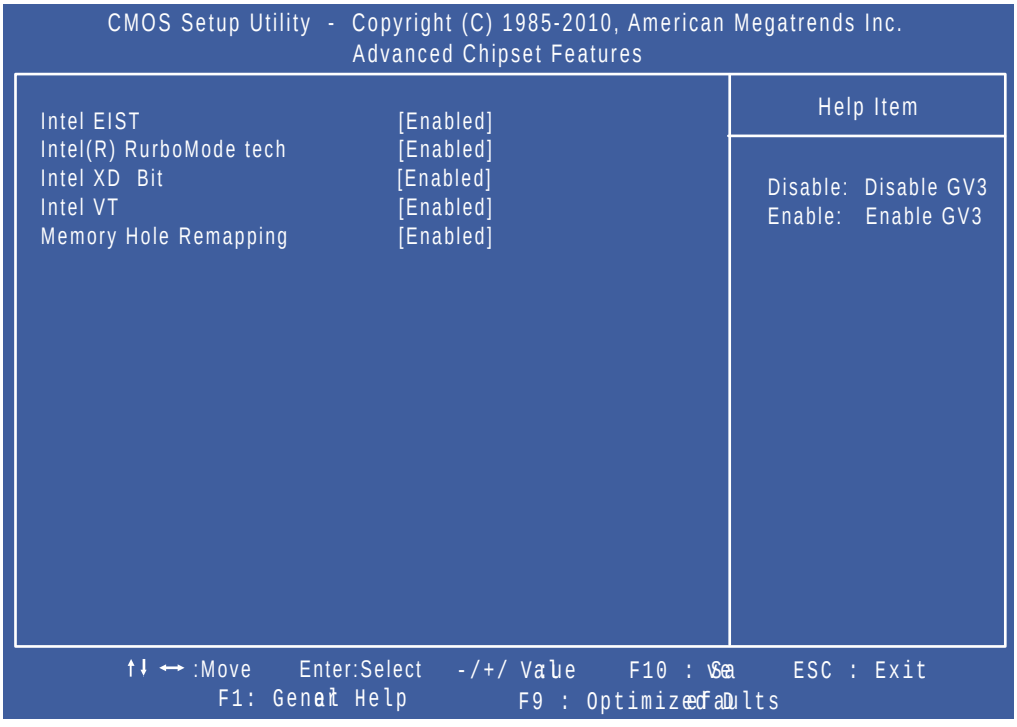


The table below describes the items, menus, and submenus in this screen.

Parameter	Description	Format/Option
Quick Boot	Allows BIOS to skip certain steps while booting.	**Enabled** or Disabled
Quiet Boot	Allows BIOS to change display parameters while booting changing boot speed.	**Enabled** or Disabled
1st Boot Device		
2nd Boot Device		
3rd Boot Device		
4th Boot Device		
Hard Disk Drive Priority	Enter to set the boot drive priority.	Press Enter to set the order priority
Optical Disk Driver Priority	Enter to set the boot driver priority.	Press Enter to set the order priority
Boot Num-Lock	Turns Num-Lock on or off on boot up.	**On** or Off
USB Beep Message	Allows a beep during USB enumeration.	Enabled or **Disabled**

Advanced Chipset Features

The Advanced Chipset Features screens.

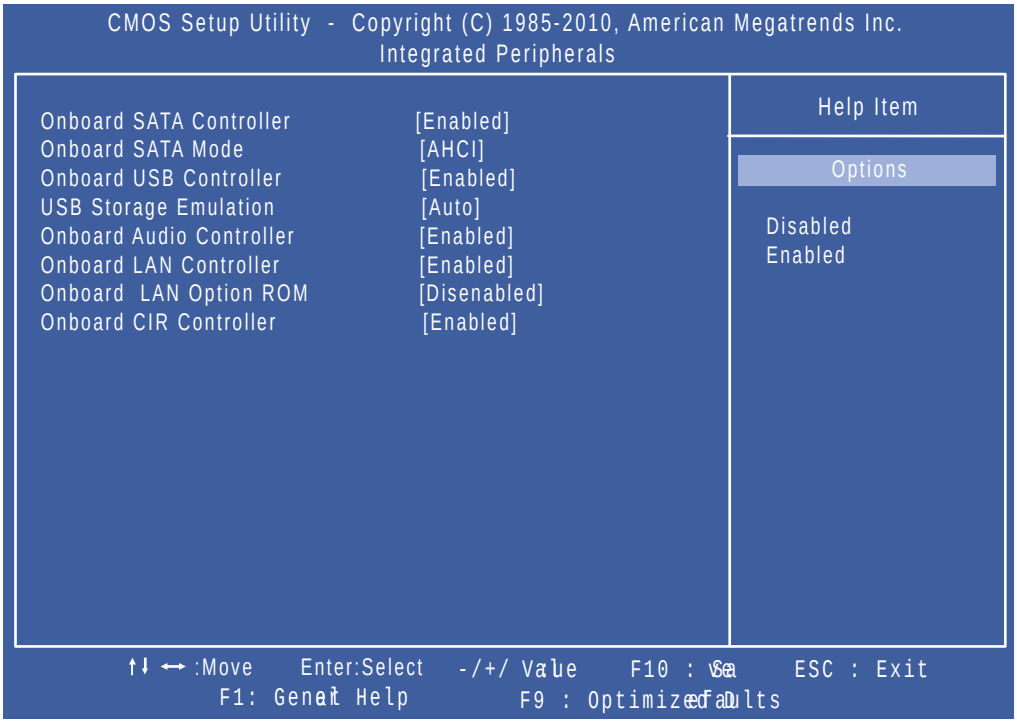


The table below describes the items, menus, and submenus in this screen.

Parameter	Description	Format/Option
Intel XD Bit	When disabled this forces the XD feature flag to always return to 0.	**Enabled** or Disabled
Memory Hole Remappingt	When enabled allows remapping of overlapped PCI memory above the total physical memory.	**Enabled** or Disabled
Video Memory Size	Sets the amount of system memory used by the internal graphics device.	Enter to set
DVMT mode	Turns on DVMT mode for use with internal graphics.	Select **DVMT**
DVMT/Fixed Memory Size	Set the memory allocated for DVMT. (XP only)	Options: • 128MB • **256MB** • Maximum

Integrated Peripherals

The Integrated Peripherals screen contains parameters for device peripherals.

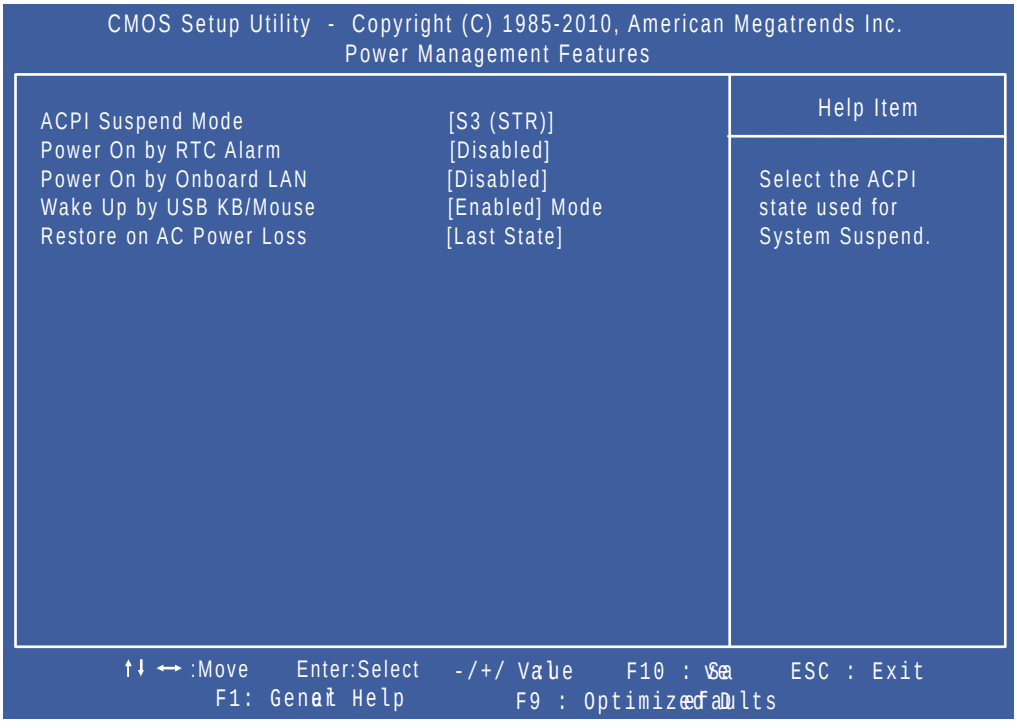


The table below describes the items, menus, and submenus in this screen.

Parameter	Description	Format/Option
Onboard SATA Controller	Enable the SATA controller	**Enabled** or Disabled
Onboard SATA Mode	Set the SATA mode	Options: • IDE • **AHCI**
Onboard USB Controller	Enable the USB controller.	**Enabled** or Disabled
USB Storage Emulation	Set the USB storage emulation	Options: • **Auto** • Floppy • Hard Disk
Onboard Audio Controller	Enable or disable the audio controller	**Enabled** or Disabled
Onboard LAN Controller	Enable or disable the LAN controller	**Enabled** or Disabled
Onboard LAN Option ROM	Disable or enable LAN optional ROM	**Disabled** or Enabled
Onboard CIR Controller	Enable or disable the CIR Controller	**Enabled** or Disable

Power Management Features

The Power Management Features screen contains parameters used for device power management.

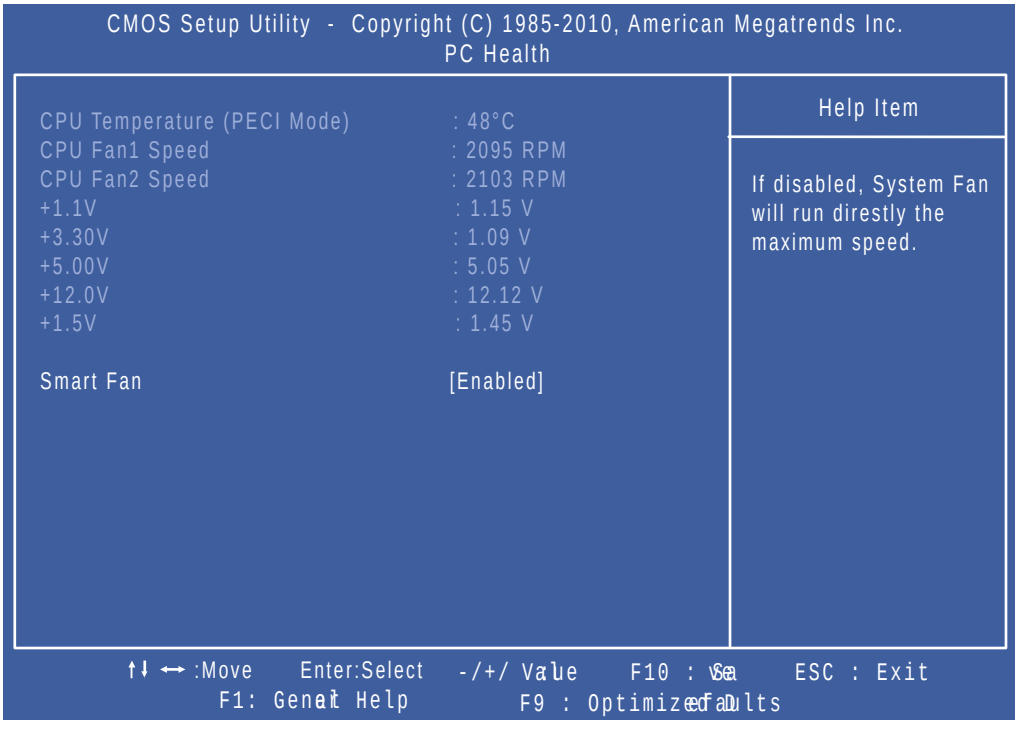


The table below describes the parameters in this screen. Settings in **boldface** are the default and suggested parameter settings.

Parameter	Description	Option
ACPI Suspend Mode	Choose between STR (Suspend to Ram) and POS (Power on Standby). POS uses more power during suspend.	S1(POS)/ **S3(STR)**
Power On by RTC Alarm	Disable or Enable auto wake up at a fixed time everyday.	**Disabled** or Enabled
Power On by onboard LAN	Disable or Enable wake up when the system power is off and a LAN device is activated.	**Disabled** or Enabled
Wake Up by USB KB/ Mouse	Disable or Enable wake up when the system is in standby and a USB device is activated.	**Enabled** or Disabled
Restore On AC Power Loss	Set the state the device returns to in the event of AC power loss. Off causes the device to remain off in the event of power loss, On restarts the device when AC power resumes, and Last State returns the device to the state it was at when power loss occurred.	**Off** or On or Last State

PC Health

The PC Health screen displays CPU/Chipset temperature information and contains customizable safety monitors for the CPU.

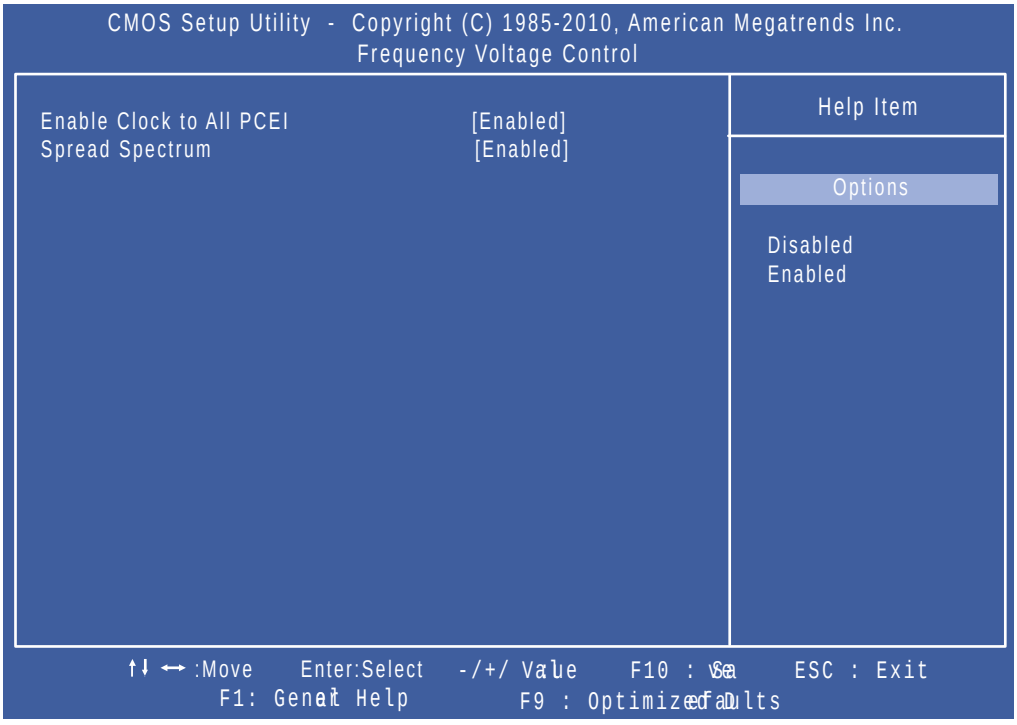


The table below describes the parameters in this screen. Settings in **boldface** are the default and suggested parameter settings.

Parameter	Description	Option
CPU Temperature	Displays the current CPU temperature (°C). This field is read only.	N/A
CPU Fan1 Speed	Displays the current CPU fan speed. This field is read only.	N/A
CPU Fan2 Speed	Displays the current system fan speed. This field is read only.	N/A
+5.00V	Displays the power supply voltage for the nominal 5V bus. This field is read only.	N/A
+3.30V	Displays the power supply voltage for the nominal 3.3V bus. This field is read only.	N/A
+1.1V	Displays the nominal 1.1 V bus. This field is read only.	N/A
+12.0V	Displays the power supply voltage for the nominal 12.0V bus. This field is read only.	N/A
Smart Fan	**Enabled allows auto fan control.** If disabled the fan runs continuously at maximum speed.	**Enabled** or Disabled.

Frequency Voltage Control

The Frequency Voltage Control Screen to set memory and processor parameters.

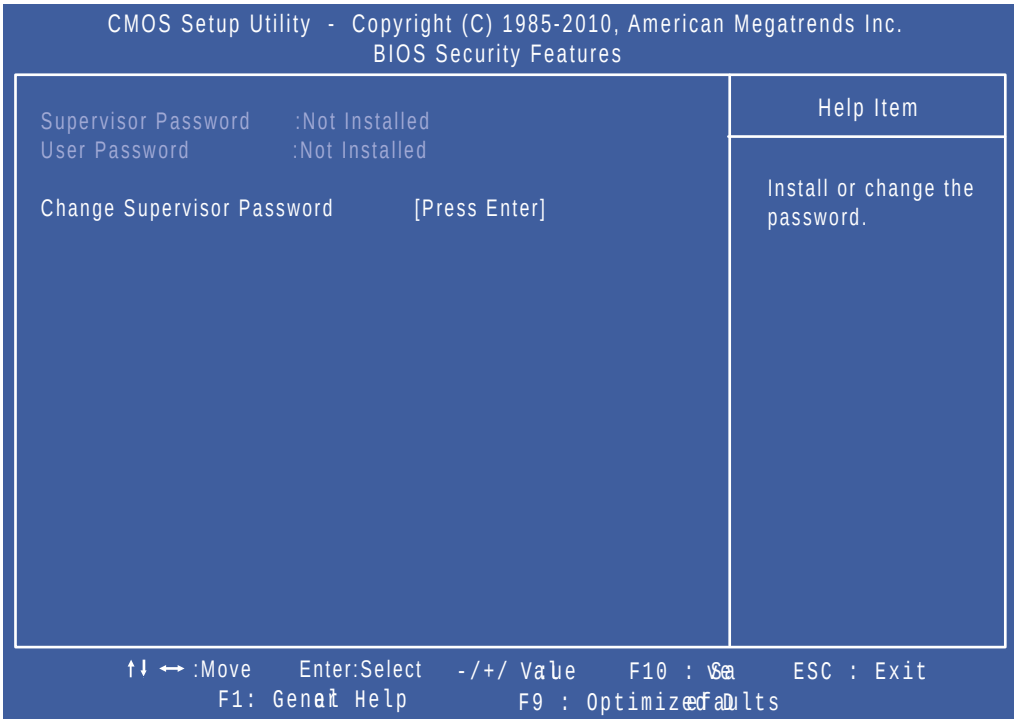


The table below describes the parameters in this screen. Settings in **boldface** are the default and suggested parameter settings.

Parameter	Description	Option
Enable Clock to All PCIE	Enabled or disabled for reducing clock consumption.	**Enabled** or Disabled
Spread Spectrum	**Enabled** to assist with EMI emissions, Disabled to assist with stability.	**Enabled** or Disabled

BIOS Security Features

The BIOS Security Features screen contains parameters that help safeguard and protect your computer from unauthorized use.



The table below describes the parameters in this screen.

Parameter	Description	Option
Supervisor Password	Shows the setting of the Supervisor password	**Not Installed** or Installed
User Password	Shows the setting of the user password	**Not Installed** or Installed
Change Supervisor Password	Press Enter to set the supervisor password. When set, this password protects the BIOS Setup Utility from unauthorized access. The user can not either enter the Setup menu nor change the value of parameters.	N/A
Change User Password	Press Enter to set the user password. When set, this password prompts the user to enter a password during the boot sequence. The user must enter the correct password to be able to continue booting the system. This option is only available if a supervisor password has been specified	N/A
Security Option	Press Enter to set the security option. This option is only available if a supervisor password has been specified.	

NOTE: When prompted to enter a password, only three tries are allowed before the system halts. Do not lose the password.

Setting a Password

Follow these steps as you set the user or the supervisor password:

1. Use the ↑ and ↓ keys to highlight the Set Supervisor Password parameter and press the **Enter** key. The Set Supervisor Password box appears:

2. Type a password in the “Enter New Password” field. The password length can not exceeds 8 alphanumeric characters (A-Z, a-z, 0-9, not case sensitive). Retype the password in the “Confirm New Password” field.

IMPORTANT: Be very careful when typing your password because the characters do not appear on the screen.

3. Press **Enter**. After setting the password, the computer sets the User Password parameter to “Set”.
4. If desired, you can opt to enable the Password on boot parameter.
5. When you are done, press F10 to save the changes and exit the BIOS Setup Utility.

Removing a Password

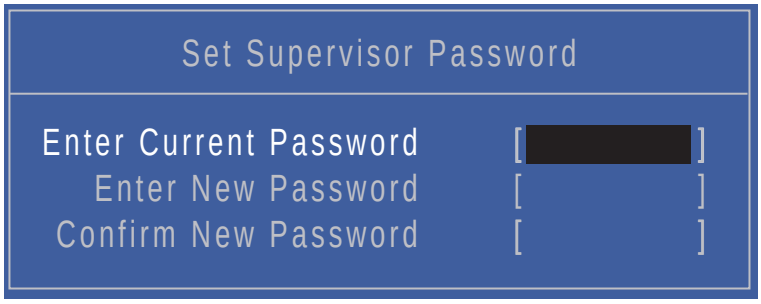
Follow these steps:

1. Use the ↑ and ↓ keys to highlight the Set Supervisor Password parameter and press the **Enter** key. The Set Password box appears:

2. Type the current password in the Enter Current Password field and press **Enter**.
3. Press **Enter** twice **without** typing anything in the Enter New Password and Confirm New Password fields. The computer then sets the Supervisor Password parameter to “Clear”.
4. When you have changed the settings, press u to save the changes and exit the BIOS Setup Utility.

Changing a Password

1. Use the ↑ and ↓ keys to highlight the Set Supervisor Password parameter and press the **Enter** key. The Set Password box appears.



2. Type the current password in the Enter Current Password field and press **Enter**.
3. Type a password in the Enter New Password field. Retype the password in the Confirm New Password field.
4. Press **Enter**. After setting the password, the computer sets the User Password parameter to “Set”.
5. If desired, you can enable the Password on boot parameter.
6. When you are done, press F10 to save the changes and exit the BIOS Setup Utility.

If the verification is OK, the screen will display as following.

The password setting is complete after the user presses **Enter**.

If the current password entered does not match the actual current password, the screen will show you the Setup Warning.

If the new password and confirm new password strings do not match, the screen will display the following message.

BIOS Flash Utilities

The BIOS flash memory update is required for the following conditions:

- New versions of system programs
- New features or options
- Restore BIOS when it becomes corrupted.

This section contains instructions for the following BIOS utilities:

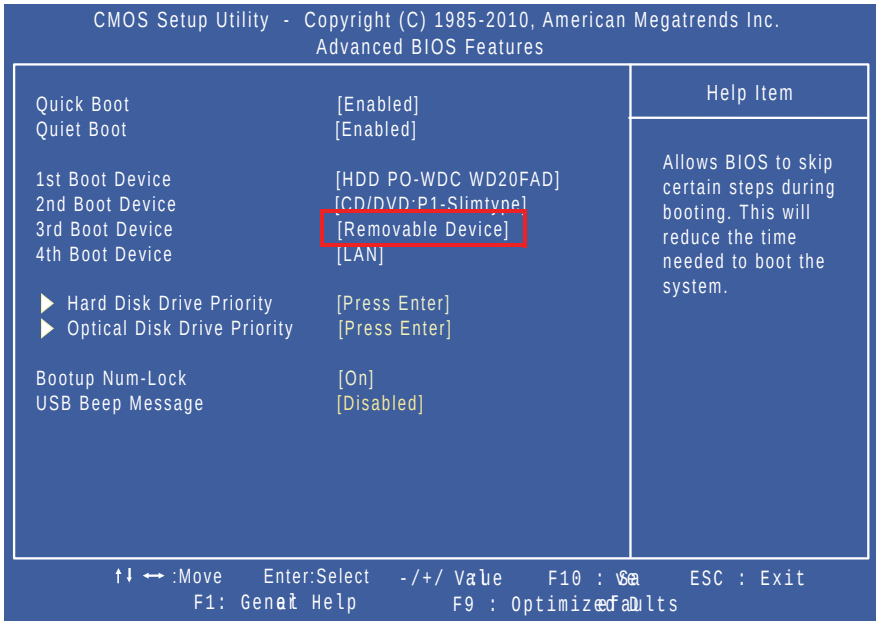
- DOS flashit utility
- WinPhlash utility
- DMI Tools

DOS Flash Utility

Perform the following steps to use the DOS Flash Utility:

1. Copy the flash utilities to the bootable device.
2. Attach the device to the system and restart.
3. Press F2 during boot to enter the Setup Menu.
4. Select **Boot Menu** to modify the boot priority order, for example, if using USB HDD to Update BIOS, move USB HDD to position 1.

IMPORTANT: Please use a device that can be booted in DOS mode (FAT 16 or FAT 32 partitions only)

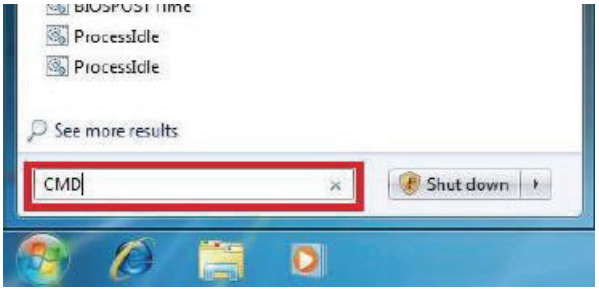


5. Navigate to the BIOS file in DOS mode.
6. Enter the command “FBB” to begin the flash BIOS process. The flash process will run automatically. When complete, the system will restart automatically.
7. When the system boots, then it will display "Press Del to Enter BIOS Setup" and "Press F1 to Continue".
8. Press F1 to load the CMOS defaults or press Del to go BIOS SETUP and manually configure BIOS.

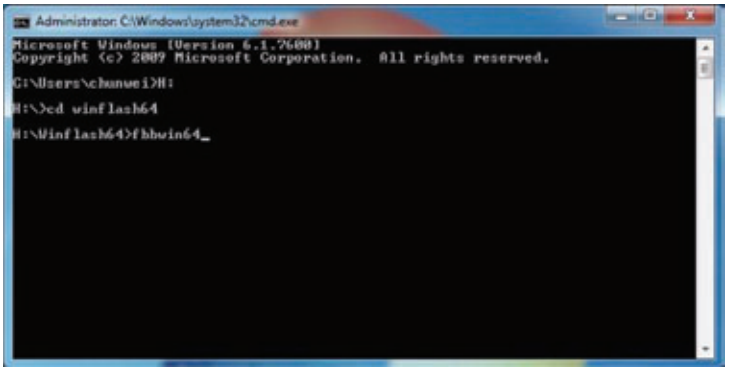
Win Flash Utility

Perform the following steps to use the WinFlash Utility:

1. Open the Start menu and type CMD to open command mode.

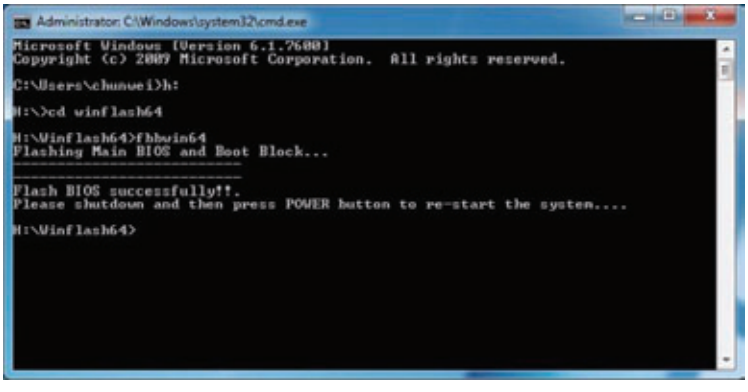


2. Type “fbbwin64” to flash BIOS. The process will start automatically.



IMPORTANT: During the flash process the keyboard and mouse will not function.

3. Once the flash process has finished, shutdown the system and press the power button to restart.



4. When the system boots, then it will display "Press Del to Enter BIOS Setup" and "Press F1 to Continue".
5. Press F1 to load the CMOS defaults or press Del to go BIOS SETUP and manually configure BIOS.

Using DMI Tools

Use QDMI30A to change the asset tag, product name, or serial number of the machine.

1. Copy the file qdmi30a.exe to USB flash disk with bootable diskette or USB drive.
2. Press F2 during boot to enter the Setup Menu.
3. Select **Boot Menu** to modify the boot priority order, for example, if using a USB HDD to run DMI Tools, move USB HDD to position 1.
4. Boot into DOS.
5. Key in “qdmi30a” then click “Enter”. The following screen appears.

Select one of the functions to modify. To modify the asset tag, key in “1” and then key in a string for the new asset tag as shown below.

To modify the product number, key in “2” then key in a new string for the product number as shown below.

To modify the serial number, key in “3” then key in a new string for the serial number as shown below.

To modify the 1394 GUID number, key in “4” then key in a new string for the 1394 GUID number as shown below

Machine Disassembly and Replacement

WARNING: This computer has two highly sensitive touchscreen sensors on the top left and right corners of the LCD. The sensors are an integral part of the LCD and cannot be separately replaced. The sensors are exposed as soon as the rear cover is removed.
During disassembly:

- **DO NOT make contact with the sensors.**
- **Raise the LCD off any surface it is placed face down on so that the sensors do not rest on the surface.**
- **ALWAYS employ an antistatic mat.**

IMPORTANT: The outside housing and color may vary from the images that appear in this section.

This chapter contains step-by-step procedures on how to disassemble the computer for maintenance and troubleshooting.

Disassembly Requirements

To disassemble the computer, you need the following tools:

- Wrist grounding strap and conductive mat for preventing electrostatic discharge
- Flat screwdriver
- Three (3) sizes of Philips screwdrivers: 7mm, 4mm and 2mm
- Pin or unbent paperclip or similar.
- Block of sponge or similar soft material smaller in surface area than the LCD and at least 1” (2.5cm) high.

NOTE: The screws for the different components vary in size. During the disassembly process, group the screws with the corresponding components to avoid mismatch when putting back the components.

General Information

Pre-disassembly Instructions

Before proceeding with the disassembly procedure, make sure that you do the following:

1. Turn off the power to the system and all peripherals.
2. Unplug the AC adapter and all power and signal cables from the system.
3. Place the system on an antistatic mat.

The flowchart provided in the succeeding disassembly section illustrates the entire disassembly sequence. Observe the order of the sequence to avoid damage to any of the hardware components.

Main Screw List

Screw	Quantity	Part Number
M2.5*4.0-I(NYLOK)IRON	6	86.G8507.001
M2.5*4.0-I(NI)(NYLOK)IRON	26	86.G8507.002
M2.5*7.0-I(B) (NYLOK)IRON	4	86.G8507.003
M4.0*6-I(NI,NYLOK)	4	86.G8507.004

Screw	Quantity	Part Number
M2.5*5.0-I(BNI)(NYLOK)IRON	3	86.G8507.005
M3*4-I(NI)(NYLOK)IRON	4	86.G8507.006
6-32UNC*5-B(NYLOK)IRON	4	86.G8507.007
M2.0*2.5-I (BNI,NYLOK)IRON	4	86.G8507.008
M2.0*3.0-I-NI-NYLOK IRON	7	86.G8507.009

Disassembly Process

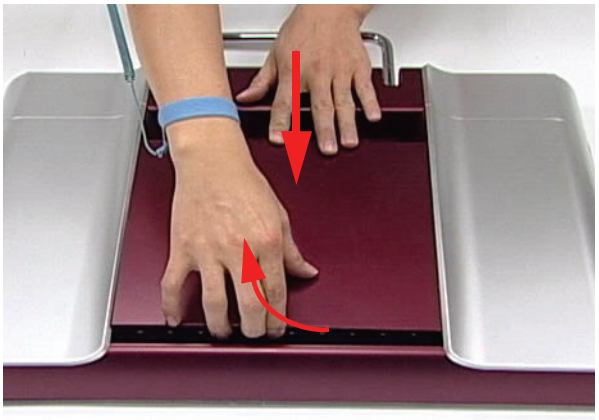
Disassembly Flowchart

Screw List

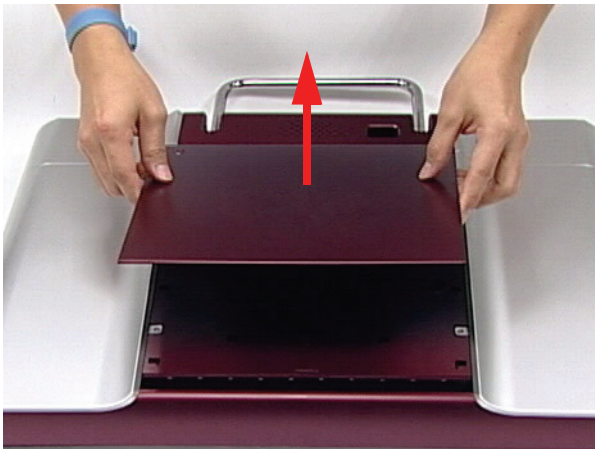
Step	Screw	Quantity
Stand Cover	M2.5*4	2
Stand Hinge	M4*6 Ni	4
Rear Cover	M2.5*7	4
Audio Board	M2.5*4 Ni	2
HDD	M2.5*4 Ni	2
HDD Bracket	M3*4 Ni	4
ODD	M2.5*4 Ni	2
ODD Brackets	M2*2.5 Ni	4
Inverter Board	M2.5*4 Ni	2
Touchscreen Control Board	M2.5*4 Ni	2
Mainboard Shielding	M2.5*4 Ni	7
WLAN	M2*3	1
TV Tuner Module	M2.5*4 Ni	1
VGA Card	M2.5*4 Ni	4
Fan	M2.5*5 Ni	3
Mainboard	M2.5*4 Ni	1
USB Board	M2.5*4 Ni	2
IR Receiver	M2*3	1
Frame	M2.5*4 Ni	15
LCD Panel	M3*4	4
Power Board	M2.5*4 Ni	2
Camera	M2*3	2
Antennas	M1.7*4	2
Speakers	M2.5*4.0-I(NYLOK)IRON	6

Removing the RAM Covers

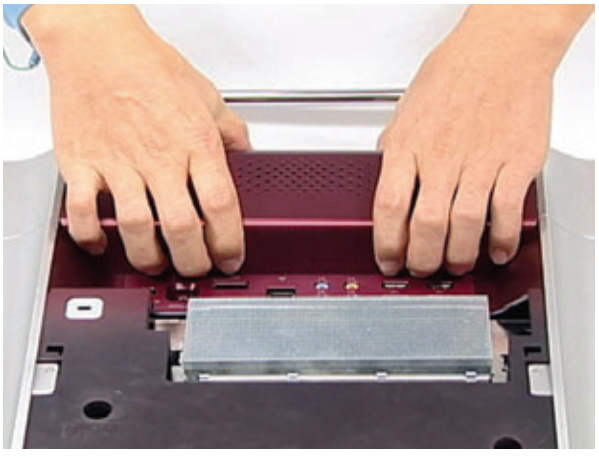
1. See “Pre-disassembly Instructions” on page 40.
2. Apply pressure to one end of the RAM Cover, while pulling up with the opposite hand as shown.



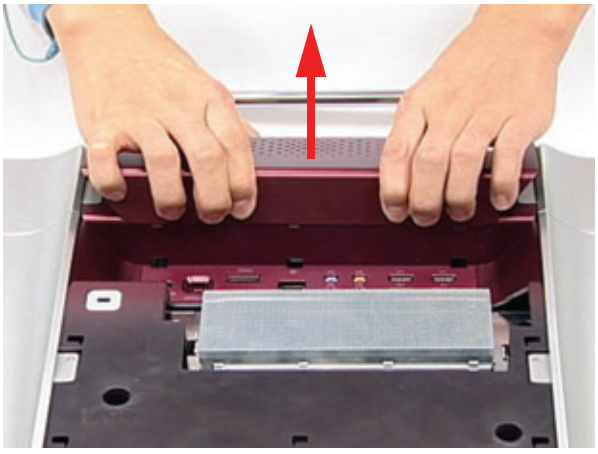
3. Lift the RAM Cover clear of the device.



4. Grasp the Hinge Cover with both hands.

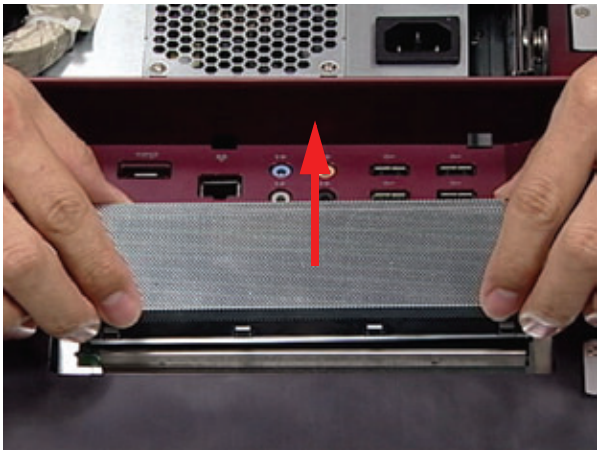


5. Lift the Hinge Cover clear of the device.



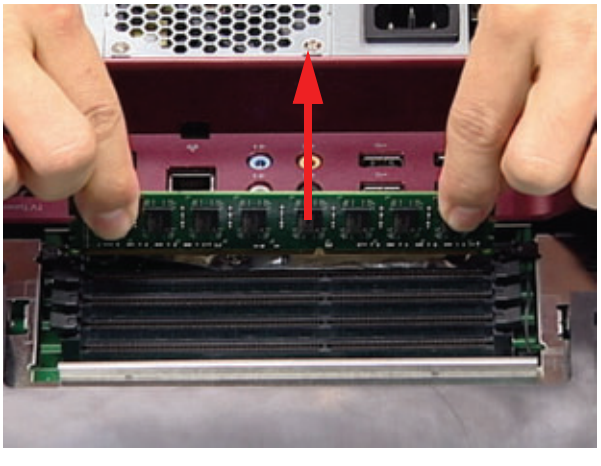
Removing the RAM

1. See “Removing the RAM Covers” on page 44
2. Lift the RAM Shielding clear of the device.



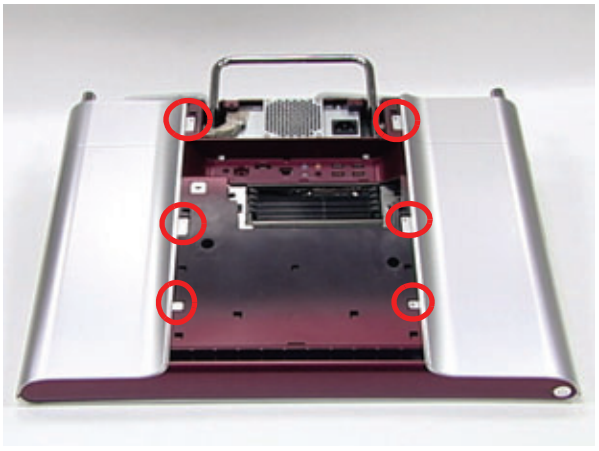
3. Unlock the latches on either side of the RAM by pressing down as shown. There is an audible click when the latch is unlocked.

4. Lift each RAM module from its slot.



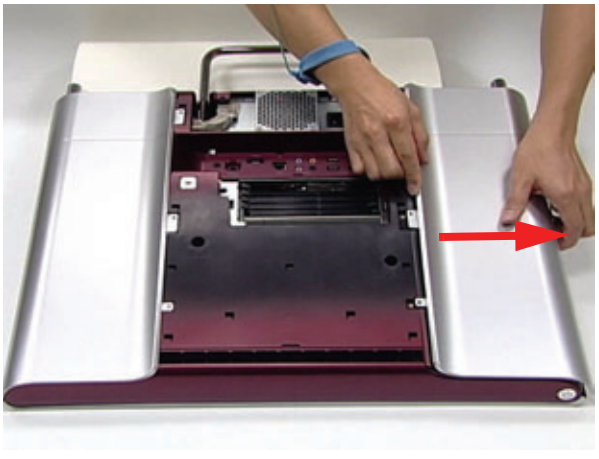
Removing the Rear Covers

1. See “Removing the RAM” on page 46
2. Remove the six (6) screws that secure the Rear Covers.

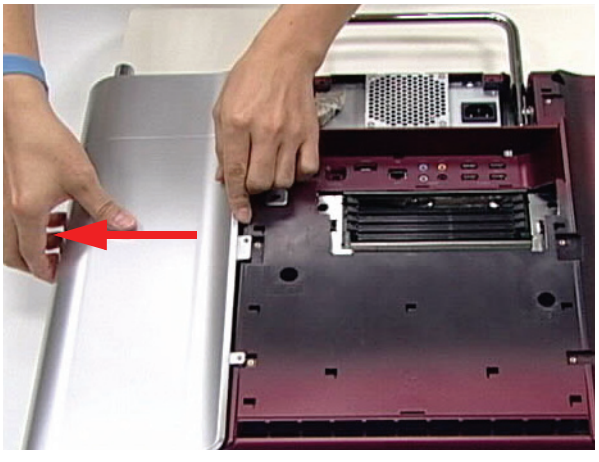


Step	Size	Quantity	Screw Type
Rear Covers	M2.5*6.0	6	

3. Use both hands to gently push the rear cover outward from the device as shown.

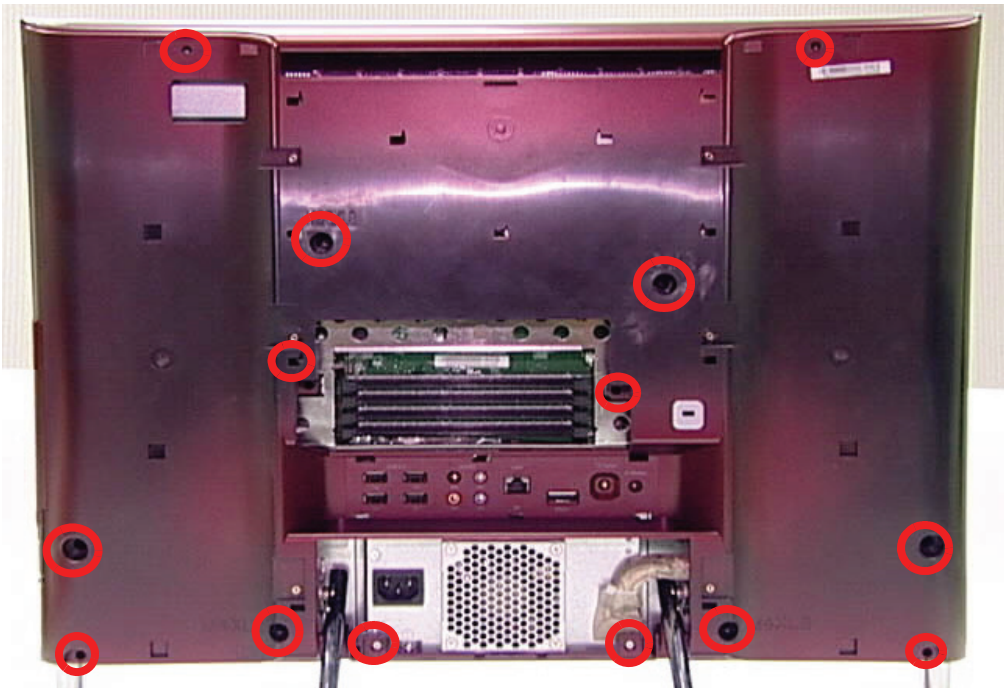


4. Repeat the previous step for the remaining rear cover.



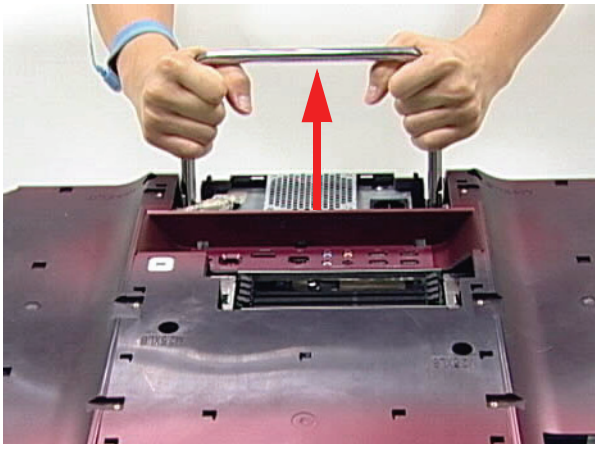
Removing the Back Cover

1. See “Removing the Touchscreen Control Board” on page 59
2. Remove the fourteen (14) screws securing the Back Cover.



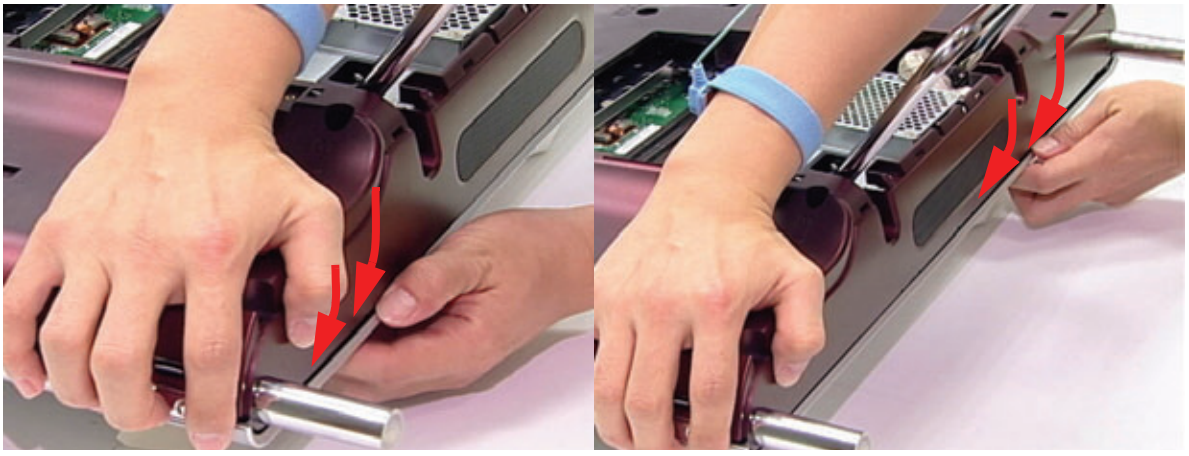
Step	Size	Quantity	Screw Type
Back Cover	2.5*8		
	2.4*8		

3. Use both hands to move the Hinge up into the stand position. There is an audible click when the Hinge is locked in position.

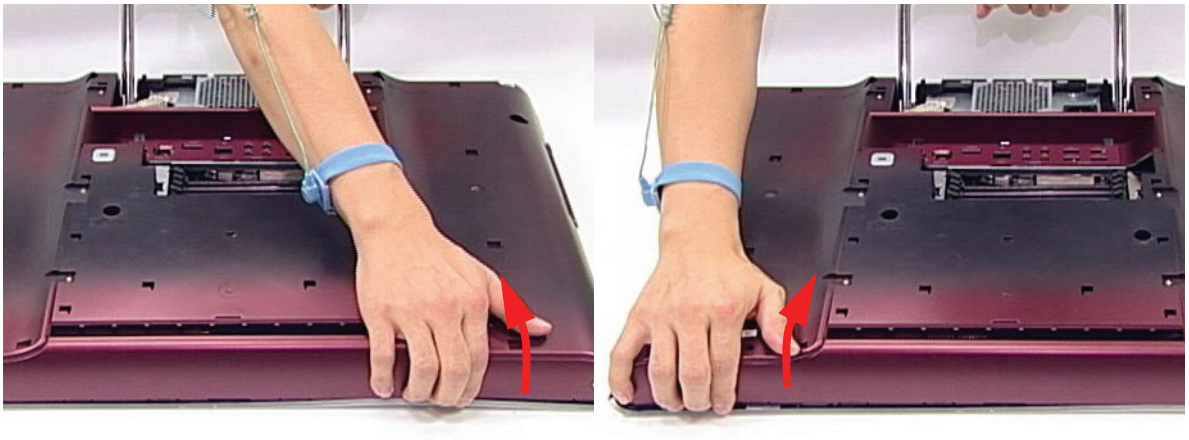


NOTE: In order to lift the Back Cover away, the Hinge must be in the stand position.

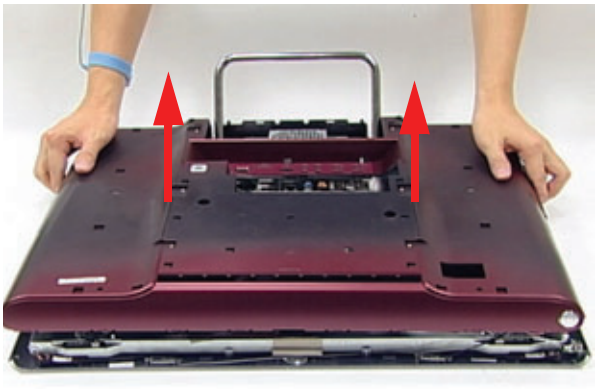
4. Place one hand firmly on the Back Cover. Use the opposite hand to pry the Bezel away, working from one corner to the other as shown. Repeat this step until all guides along the bottom of the device are unlocked.



5. Place one hand firmly on the Hinge. Use the opposite hand to pull the top of the Back Cover away from the Bezel, working from one corner to the other as shown. Repeat this step until all guides along the top of the device are unlocked.

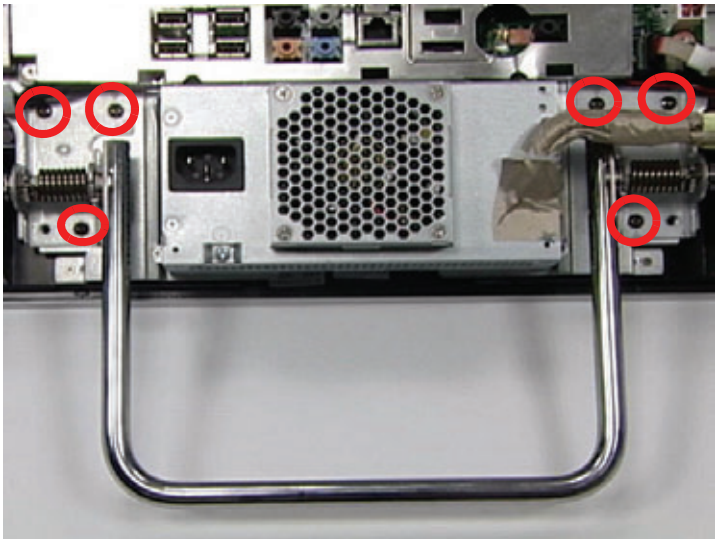


6. Lift the Back Cover clear of the device.



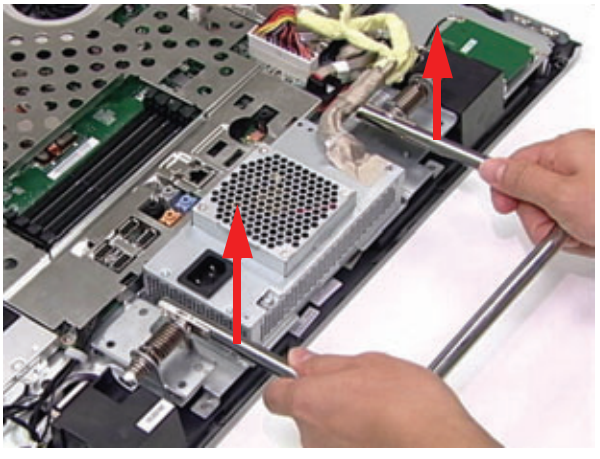
Removing the Hinge

1. See “Removing the Back Cover” on page 48
2. Replace the Hinge to the carry position.
3. Remove the six (6) screws securing the Hinge.



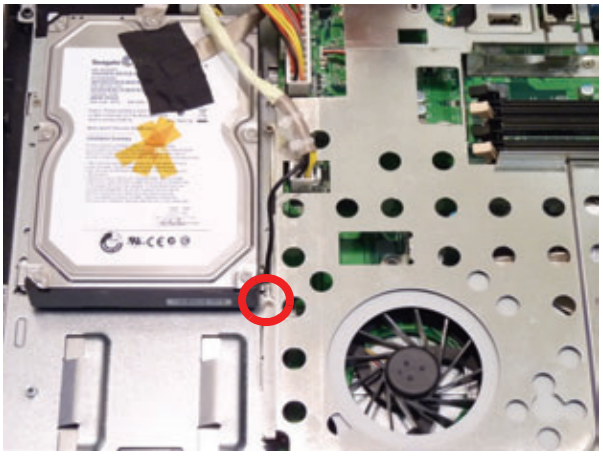
Step	Size	Quantity	Screw Type
Hinge	M4*8	6	

4. Lift the Hinge clear of the device.



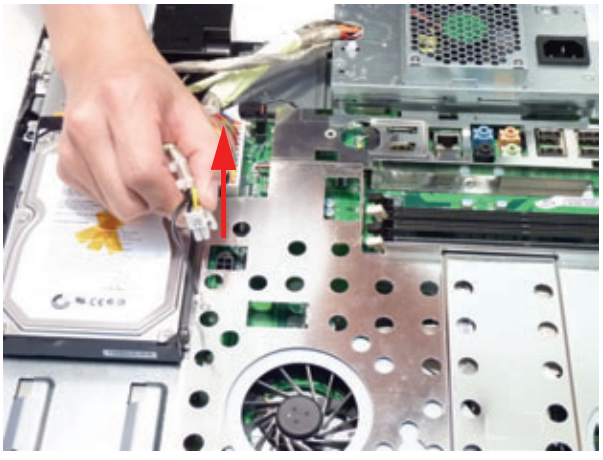
Removing the Mainboard Shielding

1. See “Removing the Audio Board” on page 63.
2. See “Removing the Touchscreen Control Board” on page 59.
3. Remove the one (1) screw from the ground wire.

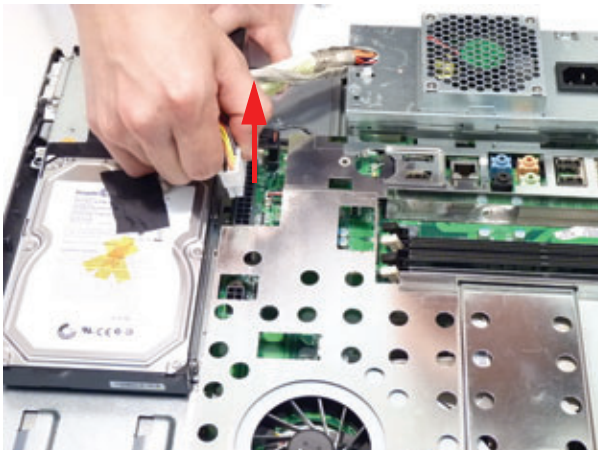


Step	Size	Quantity	Screw Type
HDD Ground Cable	M2.5*4	1	

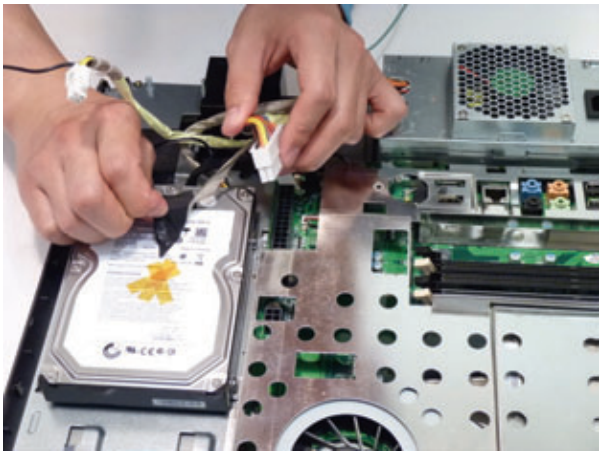
4. Remove the small power cable from the mainboard.



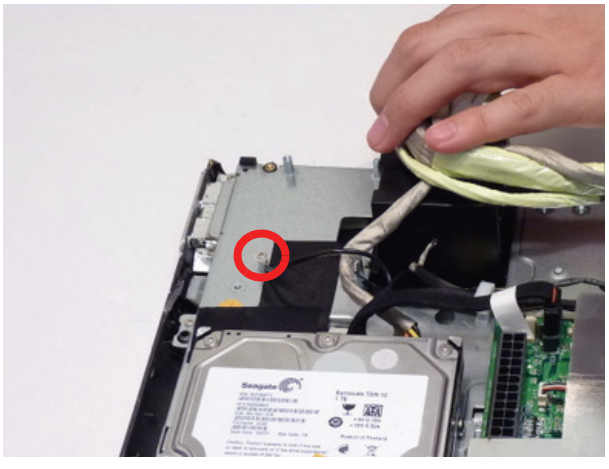
5. Detach the power cable from the mainboard.



6. Remove the adhesive tape holding the HDD ground cable to the HDD.

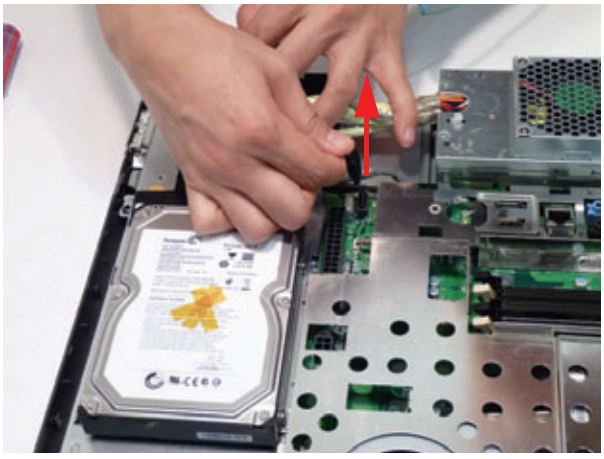


7. Remove the one (1) screw from the ground wire.

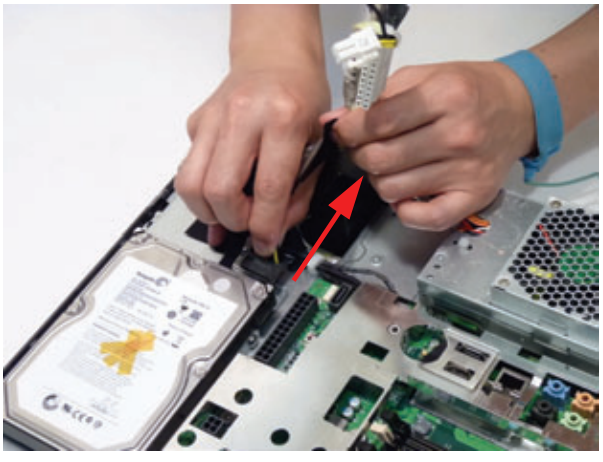


Step	Size	Quantity	Screw Type
Converter Ground Cable	M2.5*4	1	

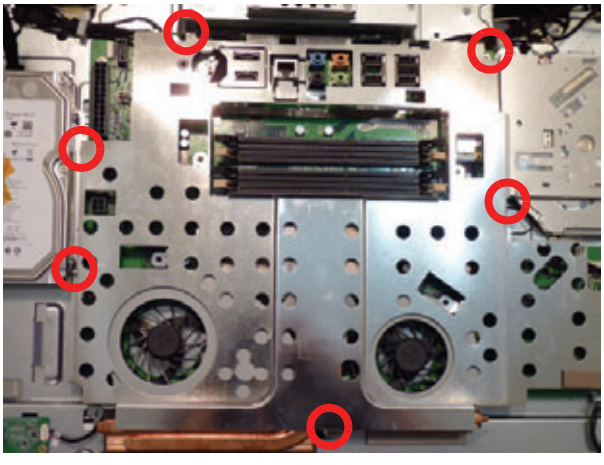
8. Disconnect the HDD cable.



9. Remove the power cable from the HDD.

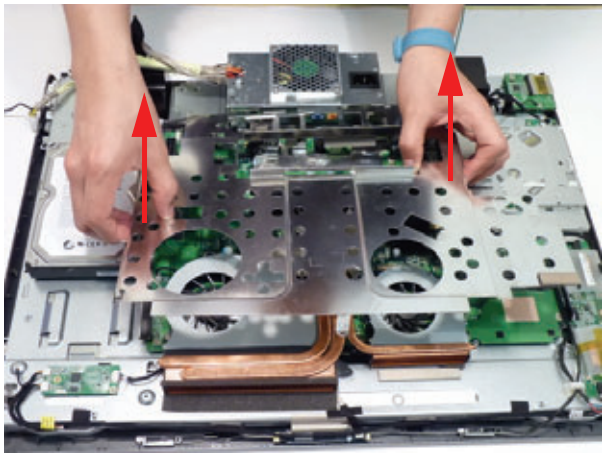


10. Remove the six (6) screws.



Step	Size	Quantity	Screw Type
Mainboard Shielding	M2.5*4Ni	6	

11. Lift the mainboard shielding away from the chassis.



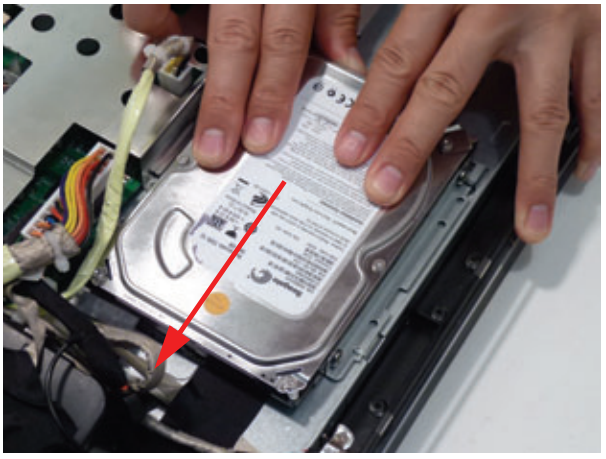
Removing the Hard Disk Drive

1. See “Removing the Back Cover” on page 48.
2. Disconnect the HDD cable.

3. Remove the two (2) screws.

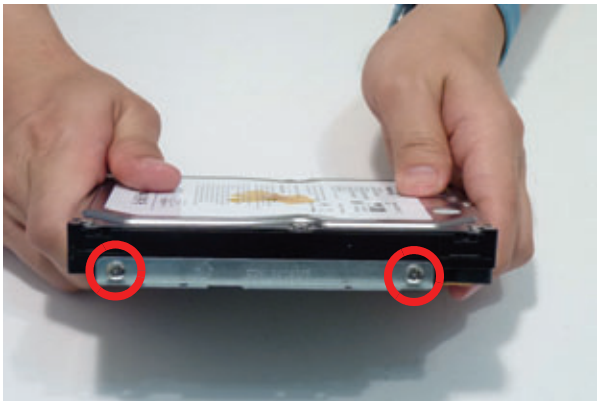
Step	Size	Quantity	Screw Type
HDD	M2.5*4	2	

4. Slide the HDD towards the speakers to release it from the flanges.



5. Lift the HDD out of the chassis.

6. Remove the four (4) screws from the HDD bracket (both sides).

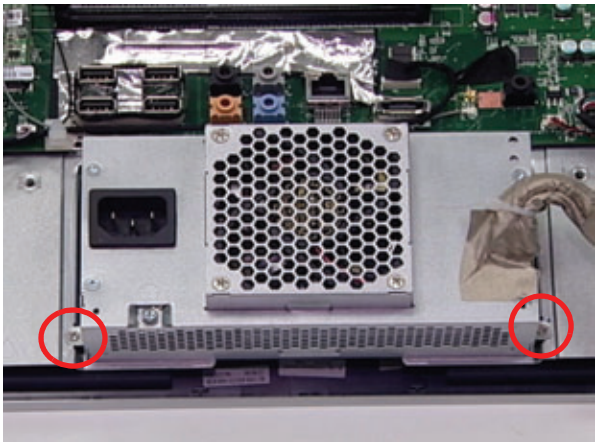


Step	Size	Quantity	Screw Type
HD Bracket	M3*4	4	

7. Remove the brackets from the HDD.

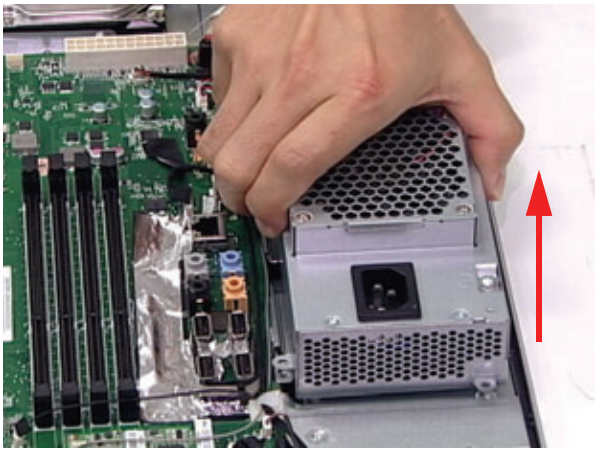
Removing the Power Supply

1. See “Removing the Hinge” on page 50
2. Remove two (2) screws securing the Power Supply as shown.



Step	Size	Quantity	Screw Type
Power Supply	M2.5*4	2	

3. Lift the Power Supply clear of the device.

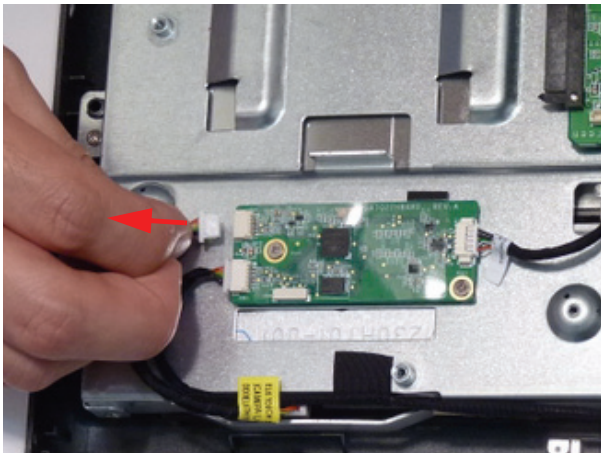


Removing the Touchscreen Control Board

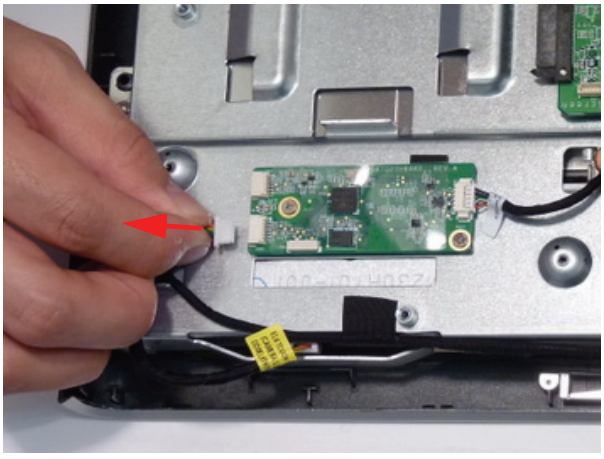
1. See “Removing the Back Cover” on page 48
2. Remove the one (1) ground cable screw.

Step	Size	Quantity	Screw Type
Touchscreen Control Board	M2.5*4	1	

3. Disconnect the right (top in this image) touch sensor cable.

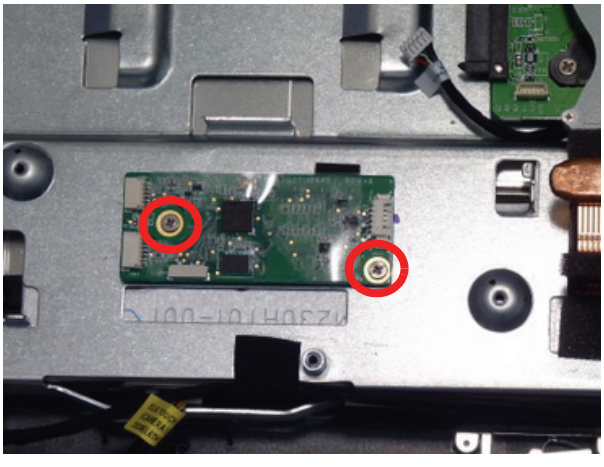


4. Disconnect the left (bottom in this image) touch sensor cable.



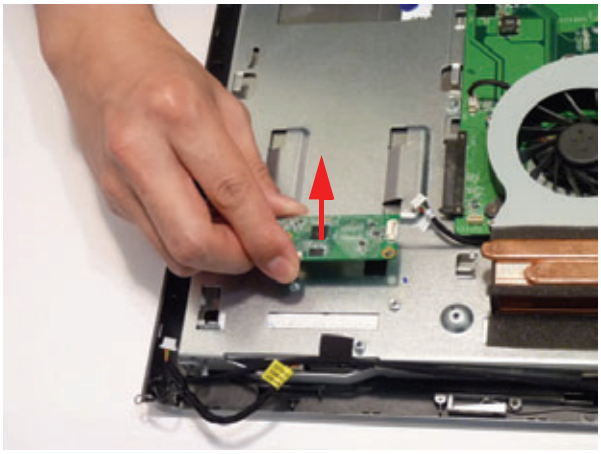
5. Disconnect the touchscreen board to mainboard cable.

6. Remove the two (2) screws.



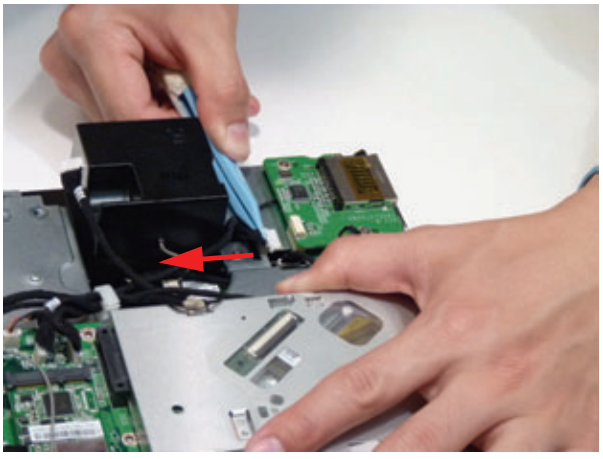
Step	Size	Quantity	Screw Type
Touchscreen Board	M2.0*4	2	

7. Lift the touchscreen board away.

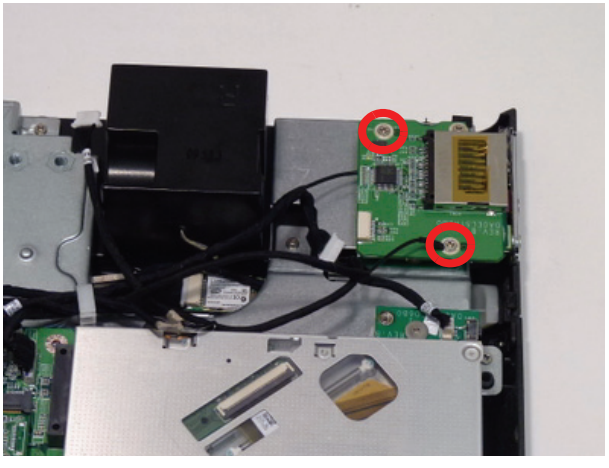


Removing the Card Reader Board

1. Disconnect the Card reader cable.

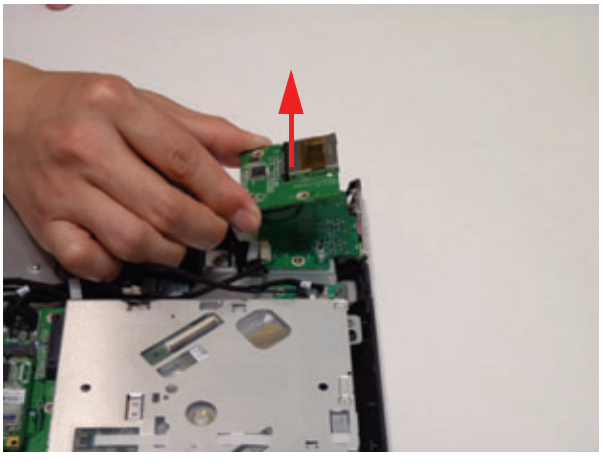


2. Remove the two (2) screws.



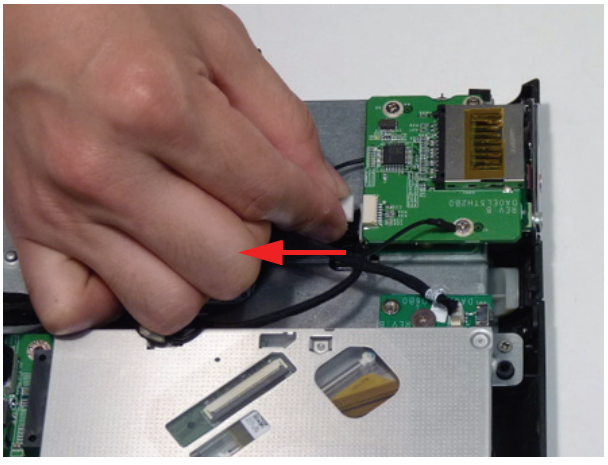
Step	Size	Quantity	Screw Type
Card Reader Board	2.5*4	2	

3. Lift the card reader board away.

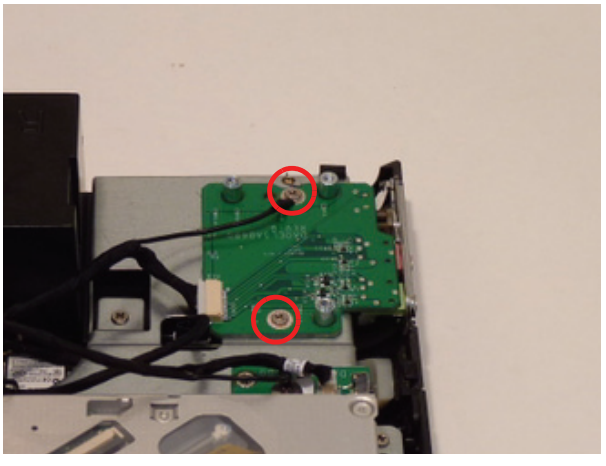


Removing the Audio Board

1. See “Removing the Back Cover” on page 48.
2. Disconnect the Audio board cable.

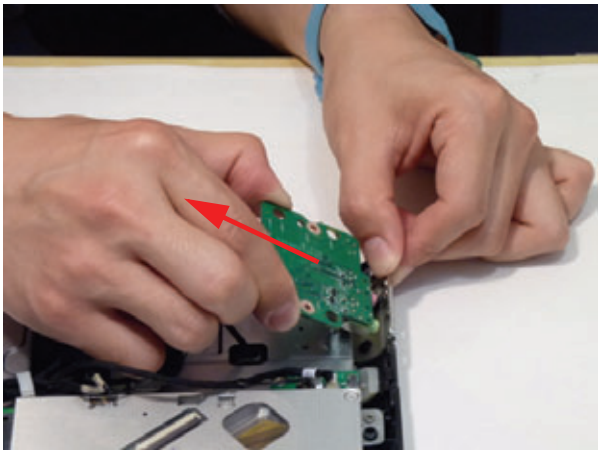


3. Remove the two (2) screws from the audio board.



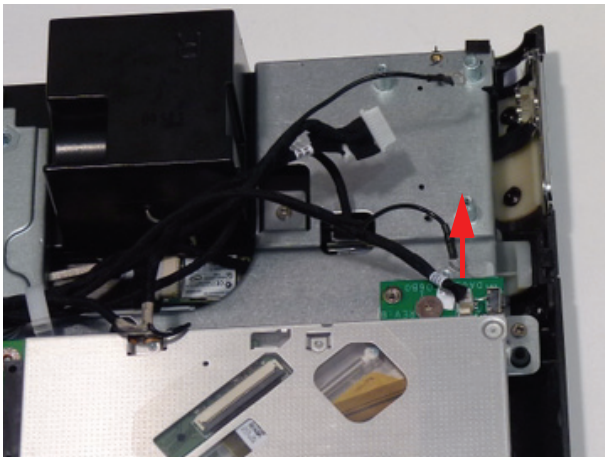
Step	Size	Quantity	Screw Type
Audio Board	M2.5*4	2	

4. Lift the audio board and cable away at an angle from the rear cover.

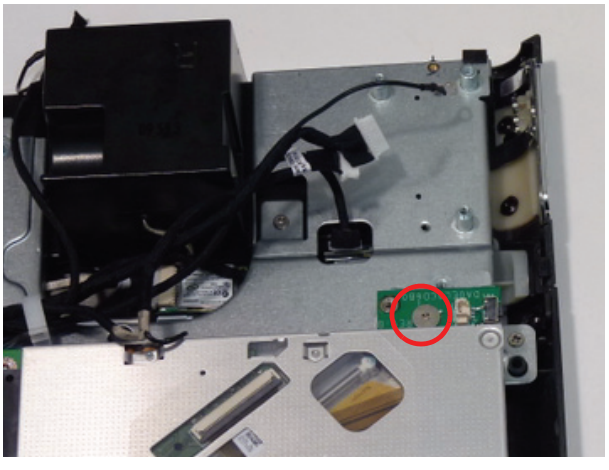


Removing the ODD Eject Board

1. See “Removing the Back Cover” on page 48
2. Disconnect the ODD Eject Board Cable.

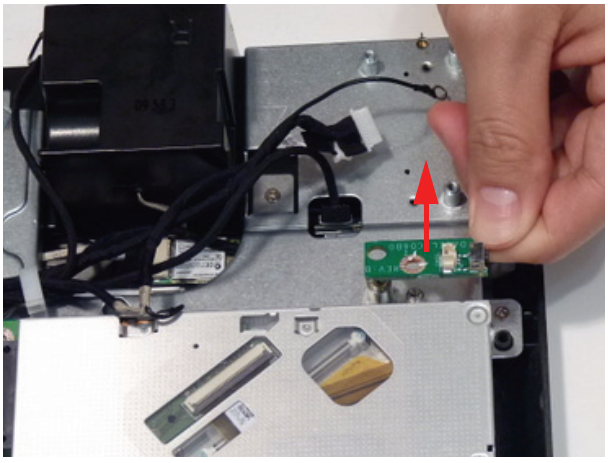


3. Remove the one (1) screw from the ODD eject board.



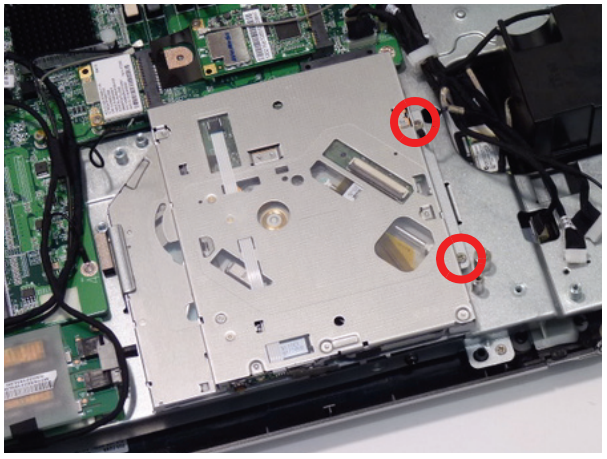
Step	Size	Quantity	Screw Type
Audio Board	M2.5*4	2	

4. Remove the ODD Eject Board.



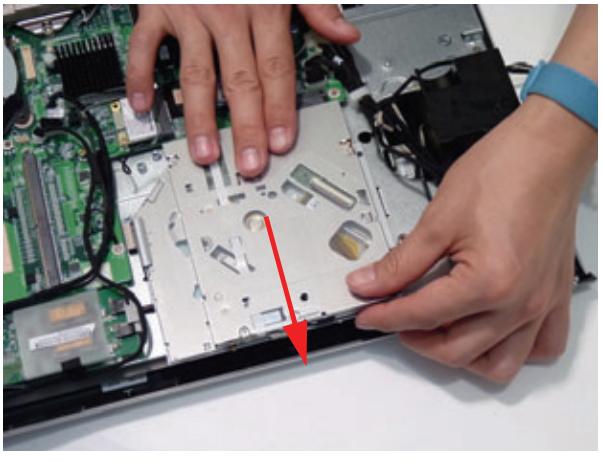
Removing the ODD

1. See “Removing the Back Cover” on page 48.
2. Remove the two (2) screws.

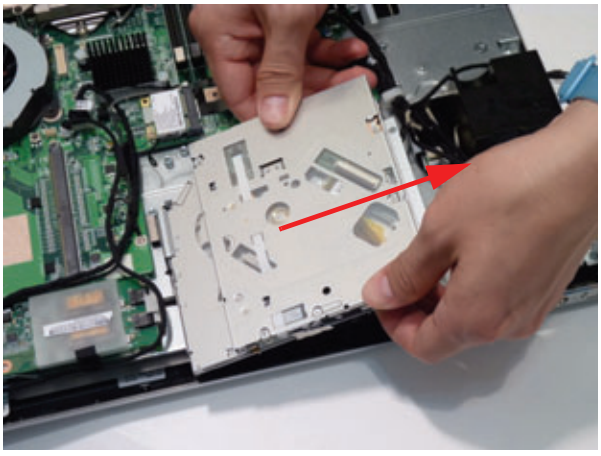


Step	Size	Quantity	Screw Type
ODD	M2.5*4	2	

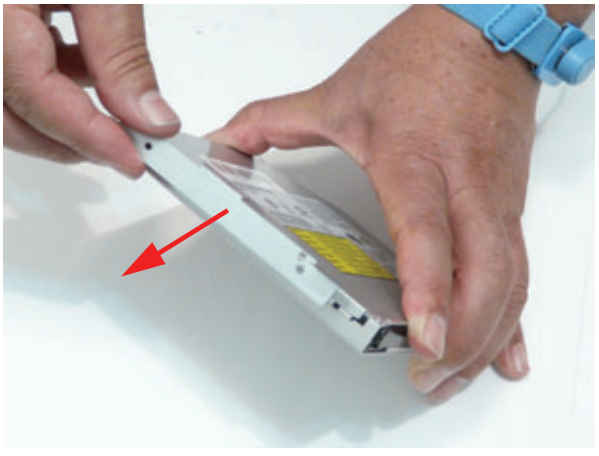
3. Slide the ODD assembly out.



4. Lift the ODD away from the chassis.



5. Remove the two (2) screws from the side bracket and remove the bracket.



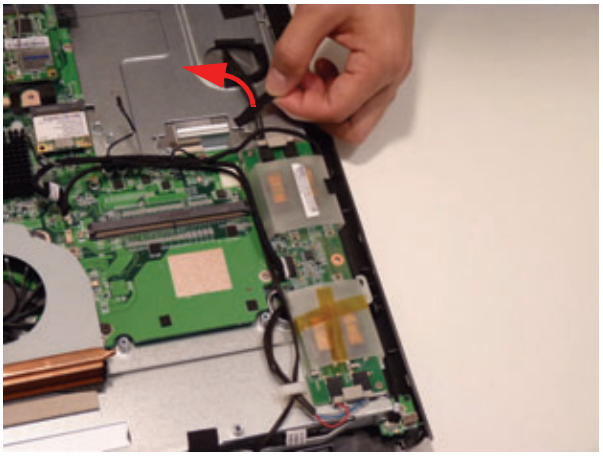
Step	Size	Quantity	Screw Type
ODD Side Bracket	M2*2.5	2	

6. Remove the two (2) screws from the ODD rear bracket and remove the bracket.

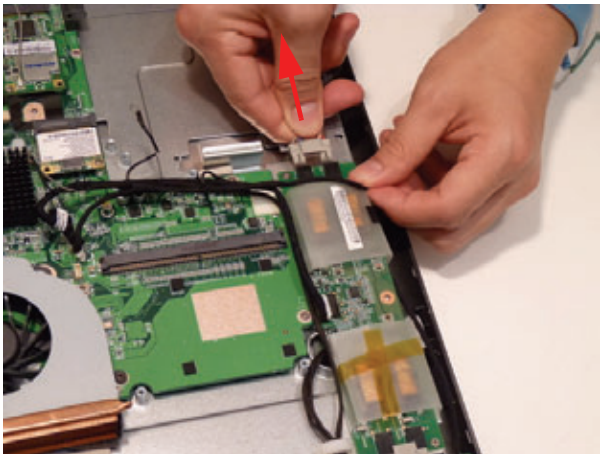
Step	Size	Quantity	Screw Type
ODD Rear Bracket	M2*2.5	2	

Removing the Inverter Board

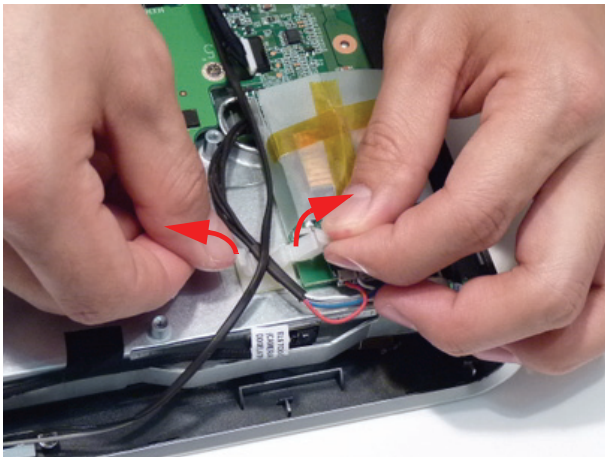
1. See “Removing the Back Cover” on page 48.
2. Remove the adhesive covering the Inverter Board cable 1.



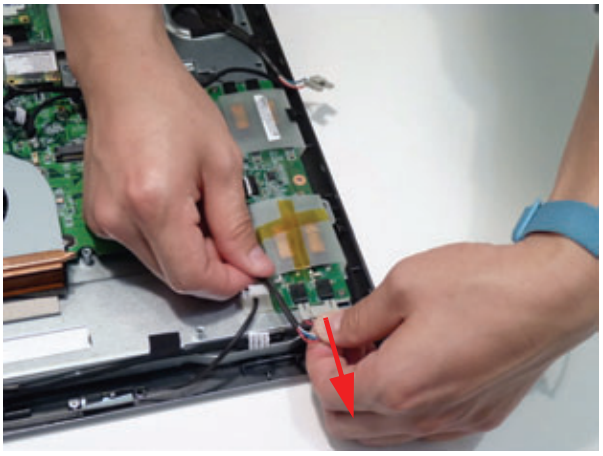
3. Disconnect the LCD to Inverter Board cable 1.



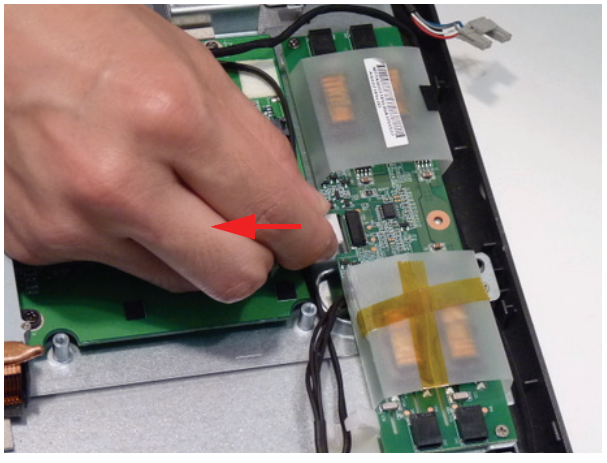
4. Unlock the cable clasp.



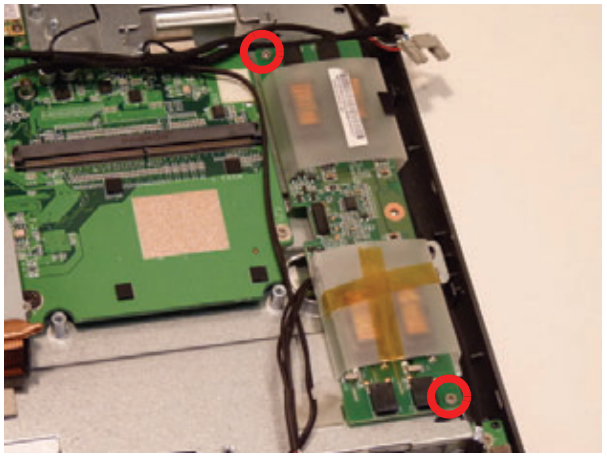
5. Disconnect the LCD to Inverter Board cable 2.



6. Disconnect the mainboard to inverter cable.

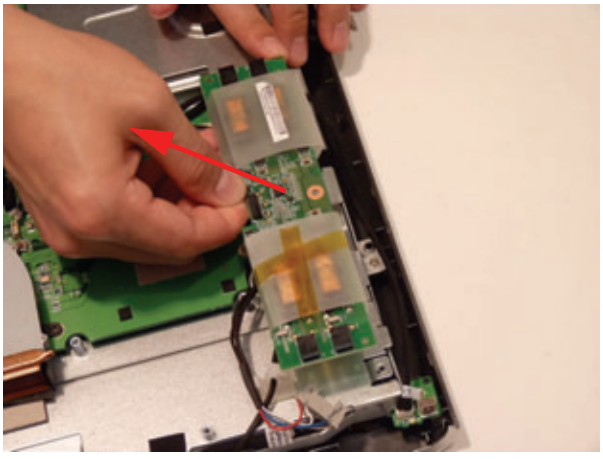


7. Remove the two (2) screws from the inverter board.



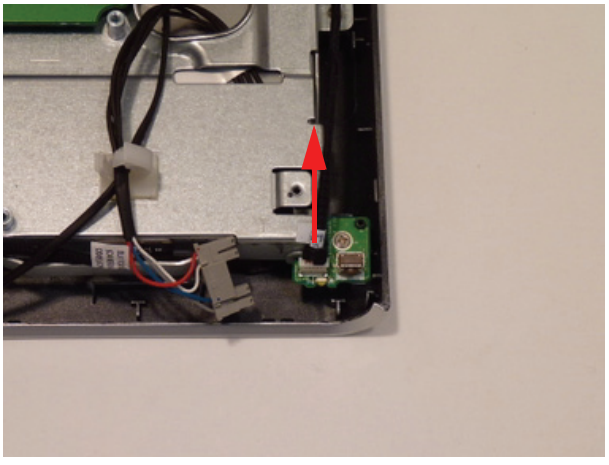
Step	Size	Quantity	Screw Type
Inverter Board	M2.5*3	2	

8. Remove the Inverter Board.

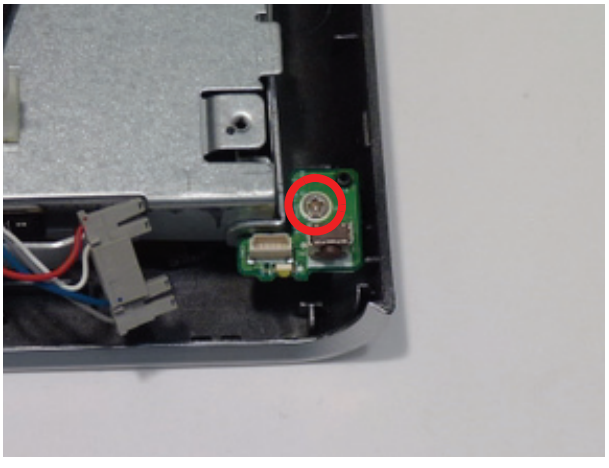


Removing the Home Button Board

1. See “Removing the Back Cover” on page 48
2. Disconnect the Home Button board cable.

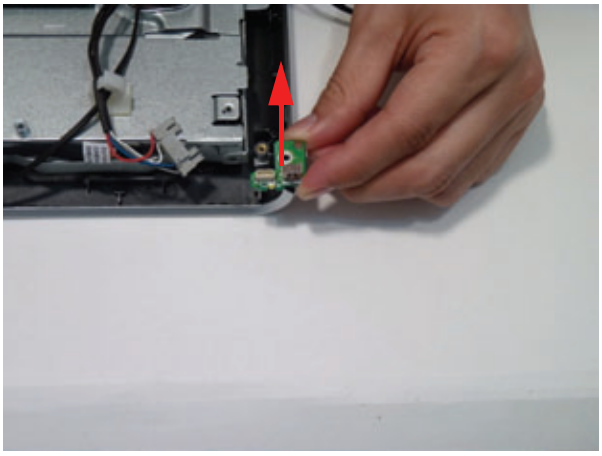


3. Remove the one (1) screw from the Home Button Board



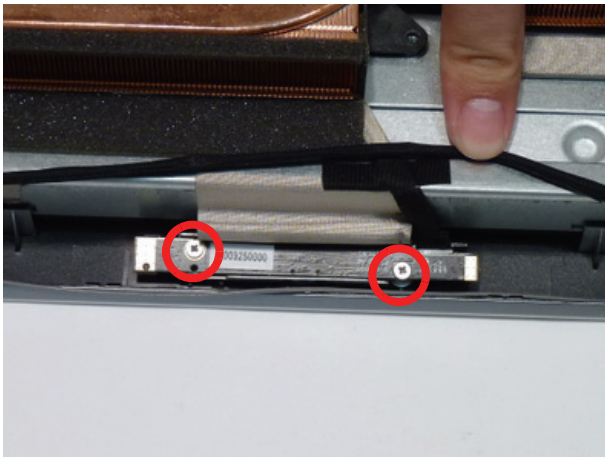
Step	Size	Quantity	Screw Type
Home Button Board	M2.5*4	1	

4. Remove the Home Button Board from the chassis.



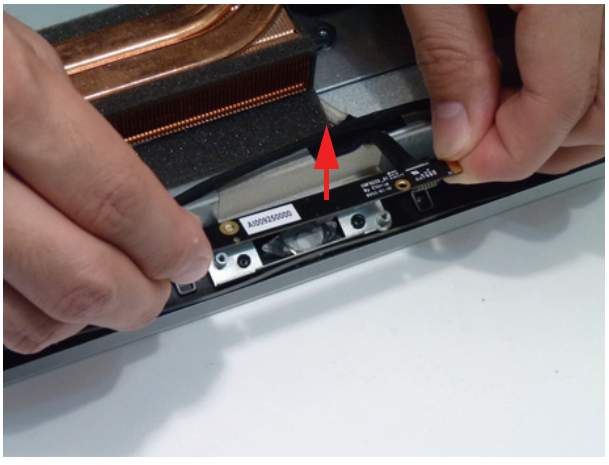
Removing the Camera Module

1. See “Removing the Back Cover” on page 48
2. Remove the two (2) screws from the Camera Module

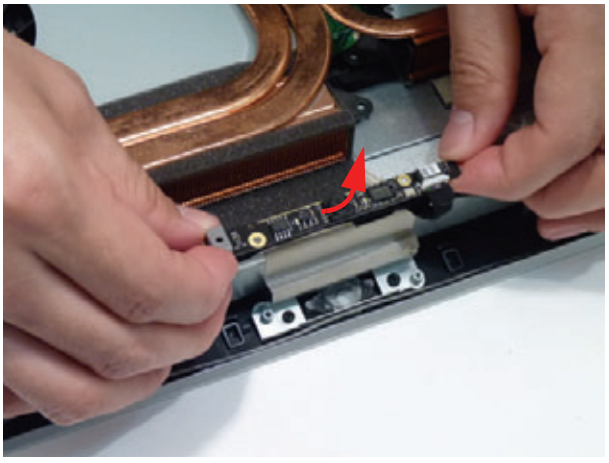


Step	Size	Quantity	Screw Type
Camera Module	M2.0*3	2	

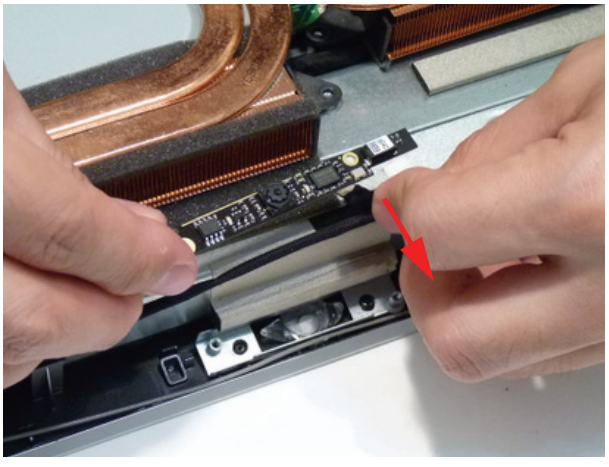
3. Lift the Camera Module out of the chassis.



4. Turn the Camera Module over.

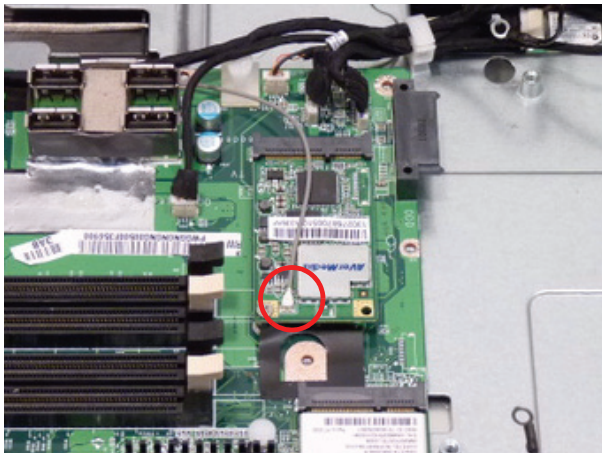


5. Disconnect the cable from the Camera Module.

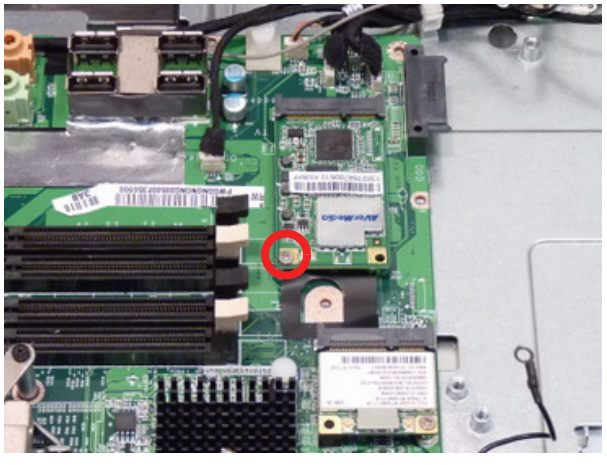


Removing the TV Tuner Module

1. See “Removing the Card Reader Board” on page 62.
2. Disconnect the TV Tuner antenna.

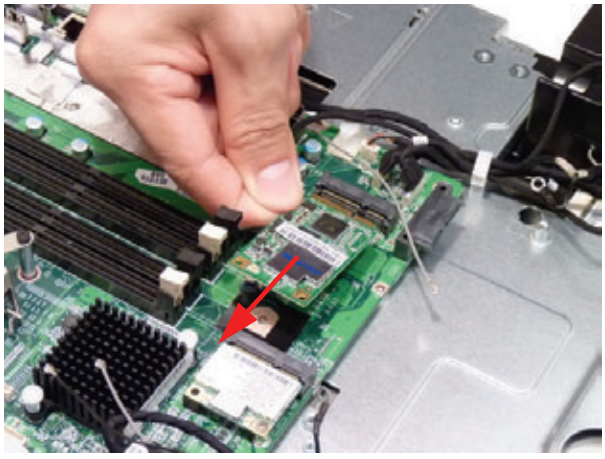


3. Remove the one (1) screw.



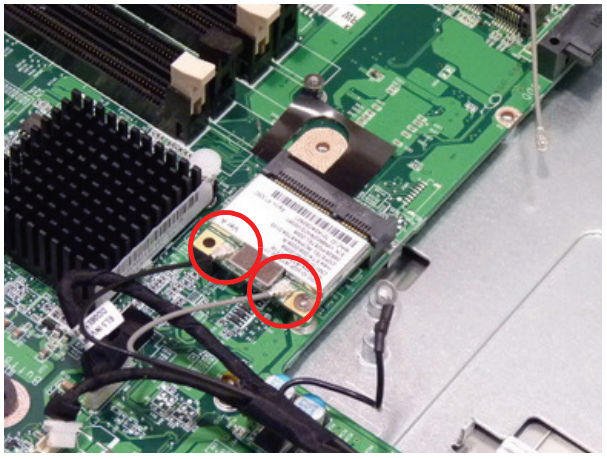
Step	Size	Quantity	Screw Type
TV Card	M2.0*3	1	

4. Lift the TV module away.

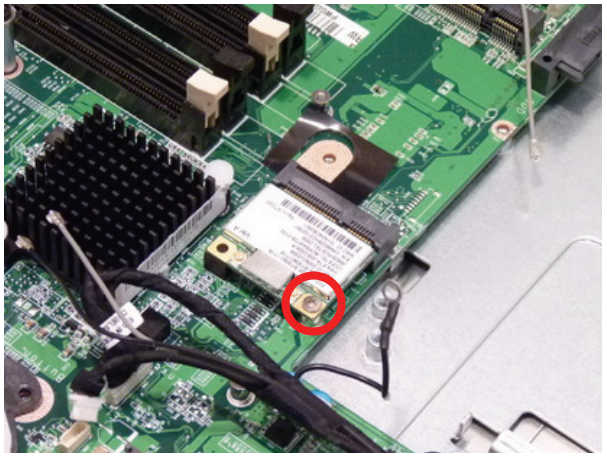


Removing the Wireless LAN Module

1. See “Removing the Card Reader Board” on page 62.
2. Disconnect the WLAN antennas.

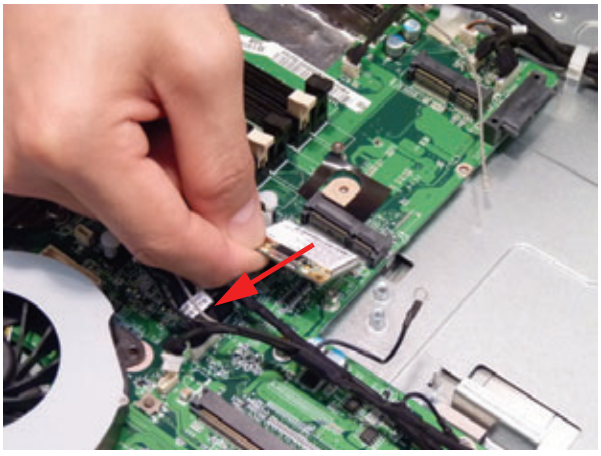


3. Remove the one (1) screw from the WLAN module.



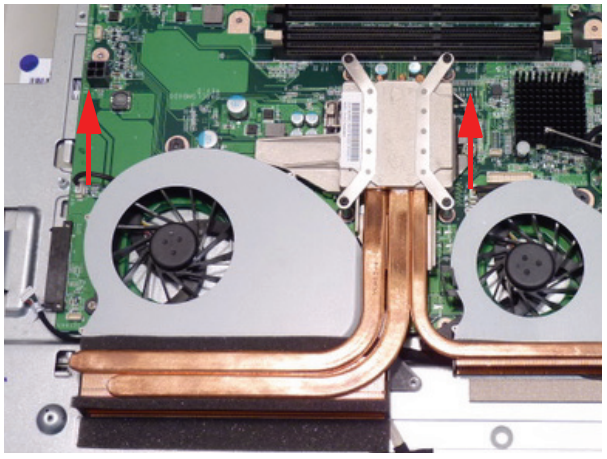
Step	Size	Quantity	Screw Type
WLAN	M2.0*3	1	

4. Lift the WLAN module away.

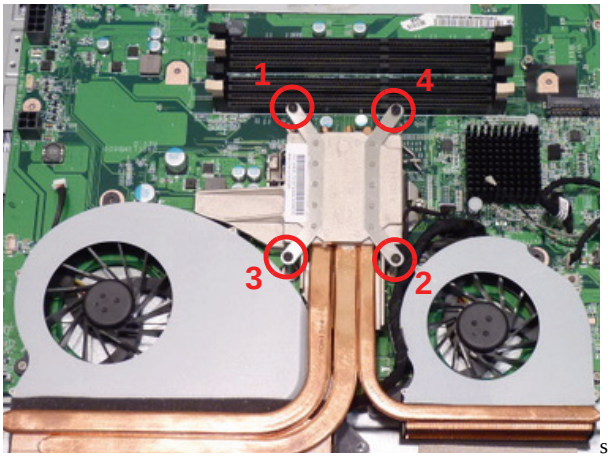


Removing the Thermal Module

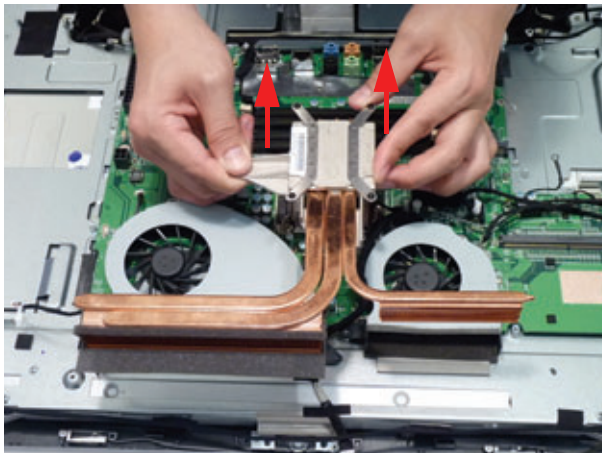
1. See “Removing the Thermal Module” on page 81.
2. Disconnect the two (2) fan cables.



3. Loosen the four (4) captive screws in numerical order (1, 2, 3, then 4).

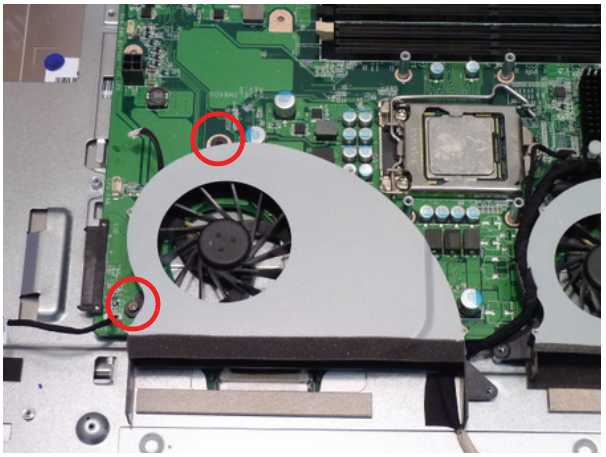


4. Lift the thermal module away.



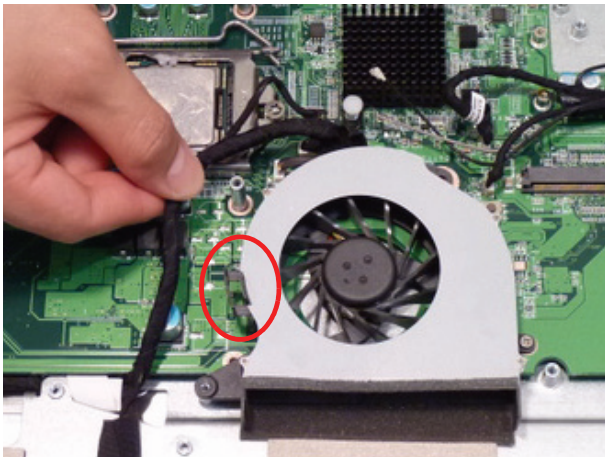
Removing the Fans

1. See “Removing the Thermal Module” on page 81.
2. Remove the two (2) screws.

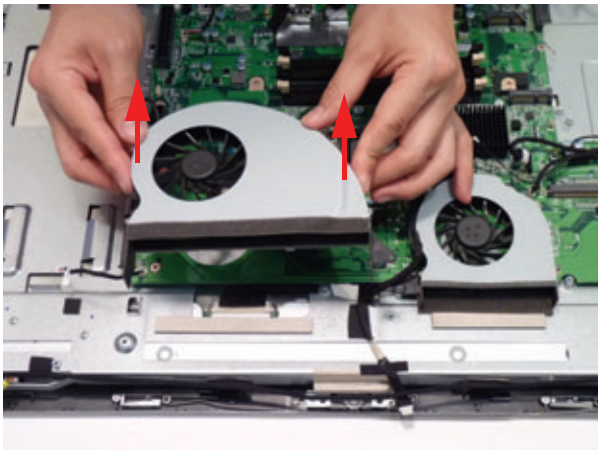


Step	Size	Quantity	Screw Type
Fan	2.5*5	2	

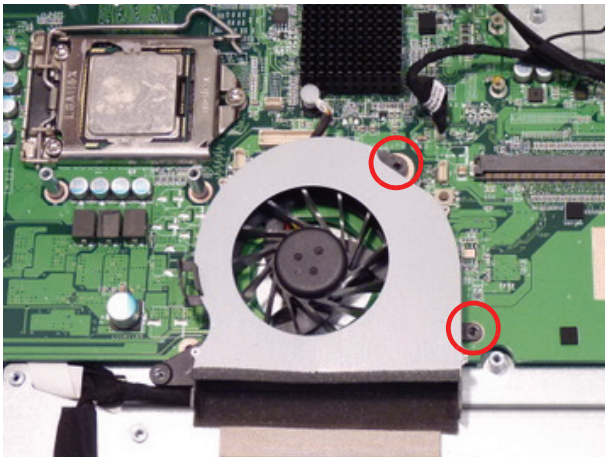
3. Remove the LVDS cable from the cable clips.



4. Remove the fan.

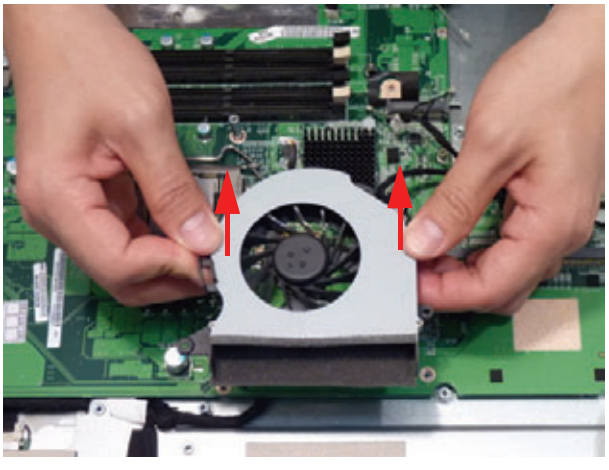


5. Remove the two (2) screws.



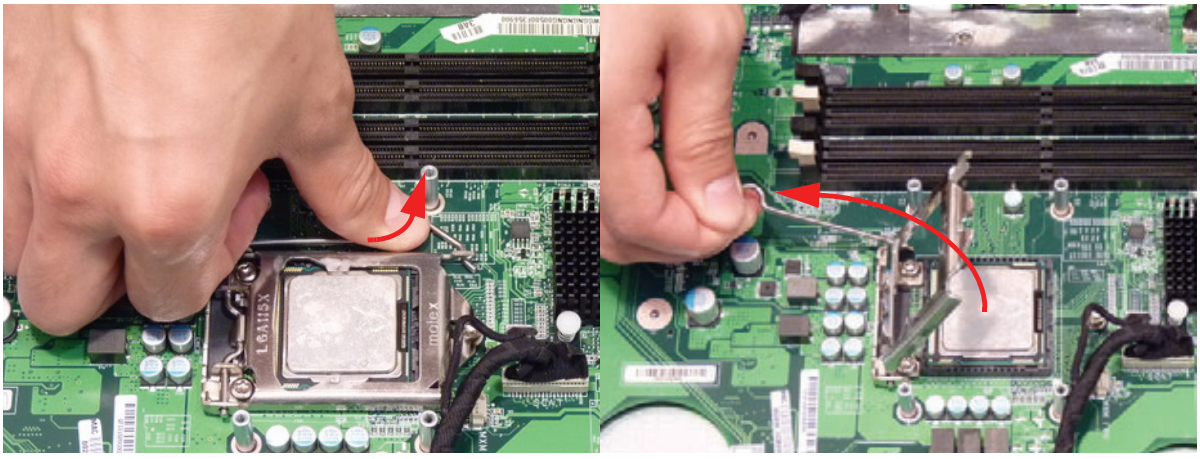
Step	Size	Quantity	Screw Type
Fan	2.5*5	2	

6. Remove the fan.

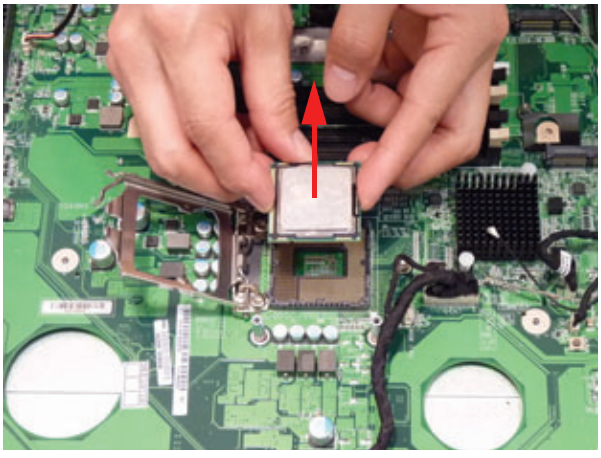


Removing the CPU

1. See “Removing the CPU” on page 84.
2. Unlock the CPU by pressing down on the locking latch and moving it out and away from the CPU.



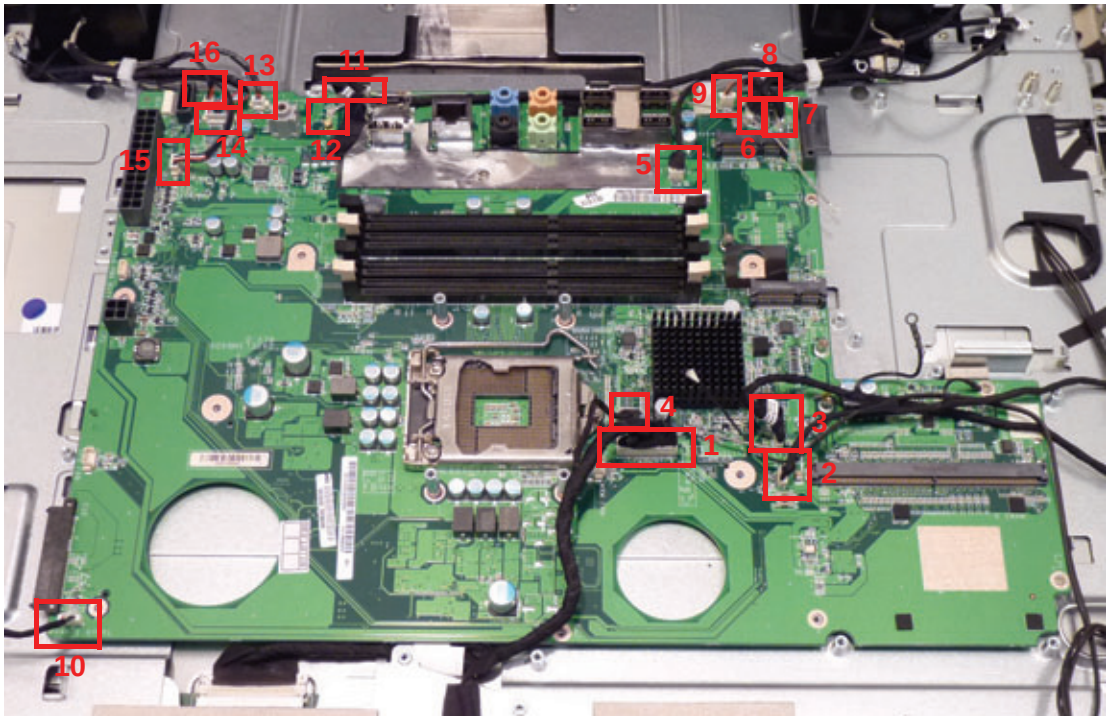
3. Lift the CPU out of the package.



CAUTION: Avoid any contact with a thermal pad or thermal grease.

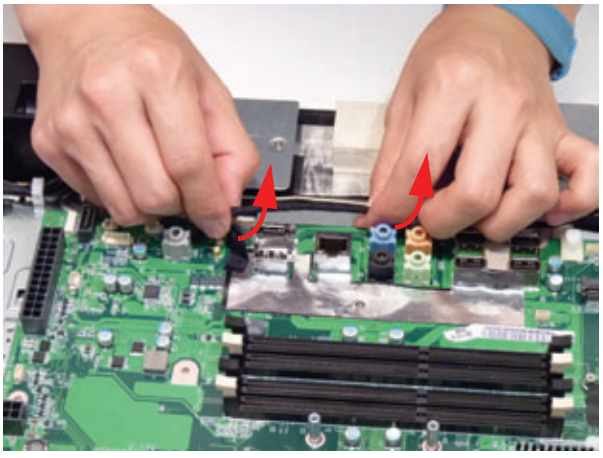
Removing the Mainboard

1. See “Removing the Card Reader Board” on page 62.
2. See “Removing the Thermal Module” on page 81.
3. See “Removing the CPU” on page 84.
4. Disconnect the sixteen (16) cables from the Mainboard as shown.

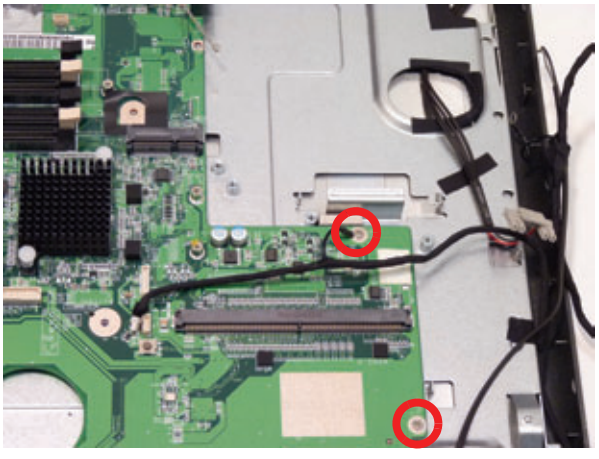


Item	Description
1	LVDS Cable
2	CCD Cable
3	Inverter Cable
4	MIC Cable
5	ODD Button Cable
6	Card Reader Cable
7	Bluetooth Cable
8	Home Button Cable
9	IR Cable
10	Touch Screen
11	Audio Cable
12	TV Tuner Cable
13	Light Foot Cable
14	USB Cable
15	Speaker Cable
16	Light Pipe Cable

5. Remove the adhesive tabs holding the Audio board cable to the mainboard.

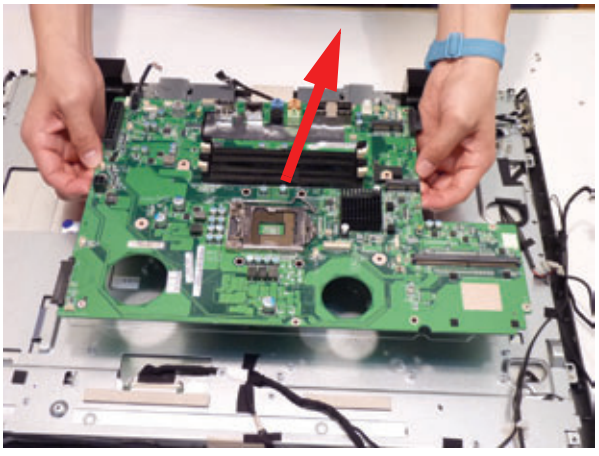


6. Remove the two (2) screws.



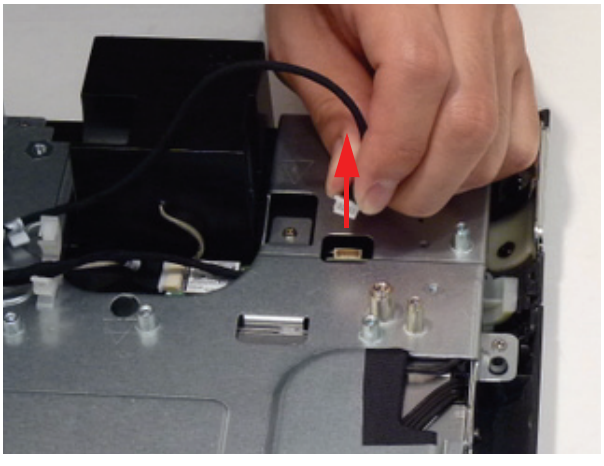
Step	Size	Quantity	Screw Type
Mainboard	M2.5*4	1	

7. Lift the mainboard away.

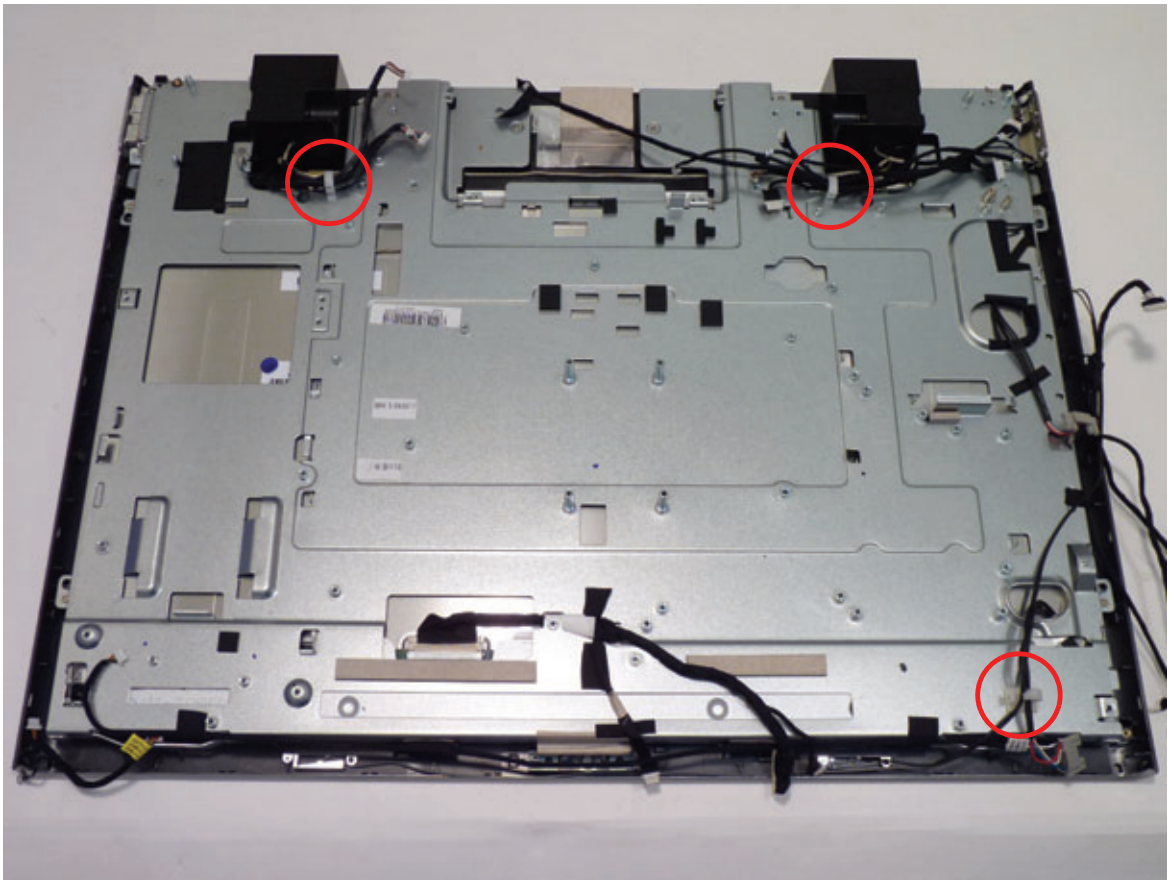


NOTE: Circuit boards >10 cm² have been highlighted with a yellow rectangle as shown in the previous image. Please detach the Circuit board and follow local regulations for disposal.

8. Disconnect the IR Board cable and remove.

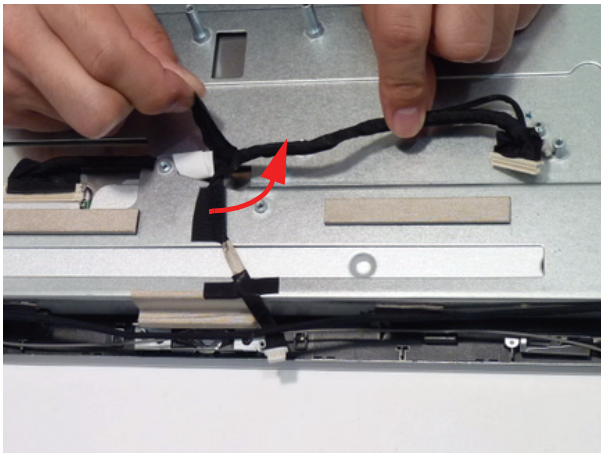


9. Open cable clips as shown. Remove all cables from cable clips.
   NOTE: Make note of the location which cables belong in which clip before removing them.

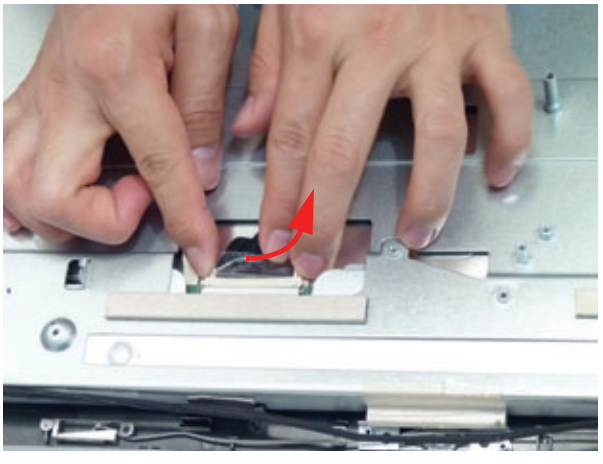


Removing the Frame

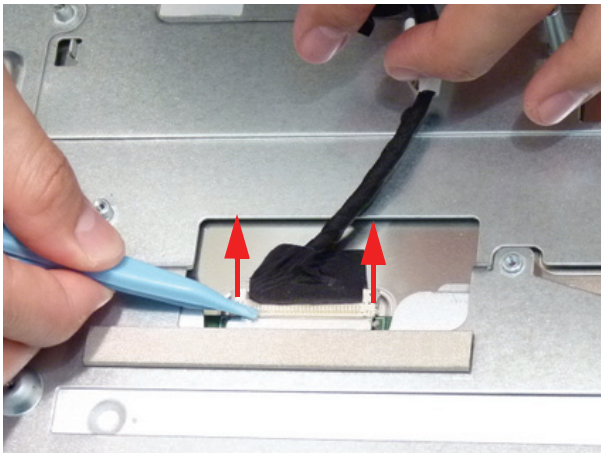
1. See “Removing the Mainboard Shielding” on page 51.
2. See “Removing the Touchscreen Control Board” on page 59.
3. See “Removing the Mainboard” on page 85.
4. See “Removing the Frame” on page 89.
5. See “Removing the Frame” on page 89.
6. Remove the adhesive tape holding the LVDS cable to the LCD bracket.



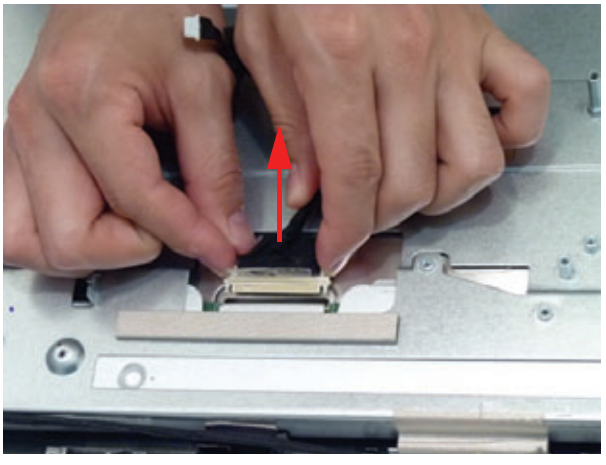
7. Remove the LVDS connector protective cover.



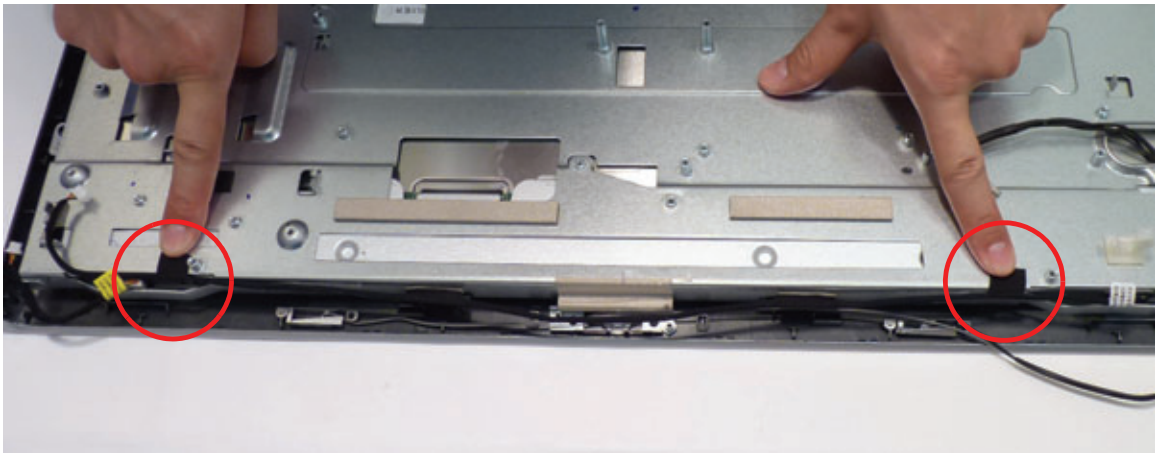
8. Unlock the LVDS cable.

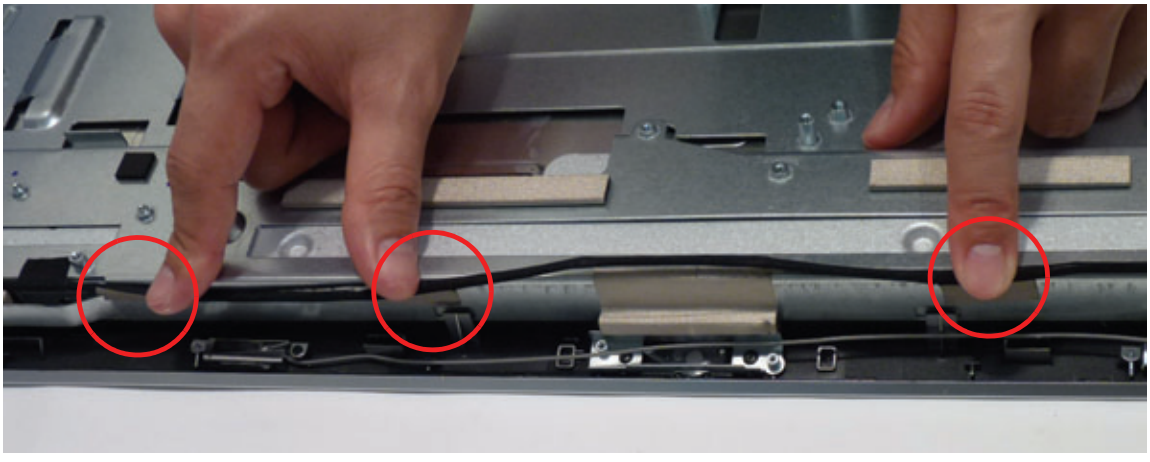


9. Remove the LVDS cable.

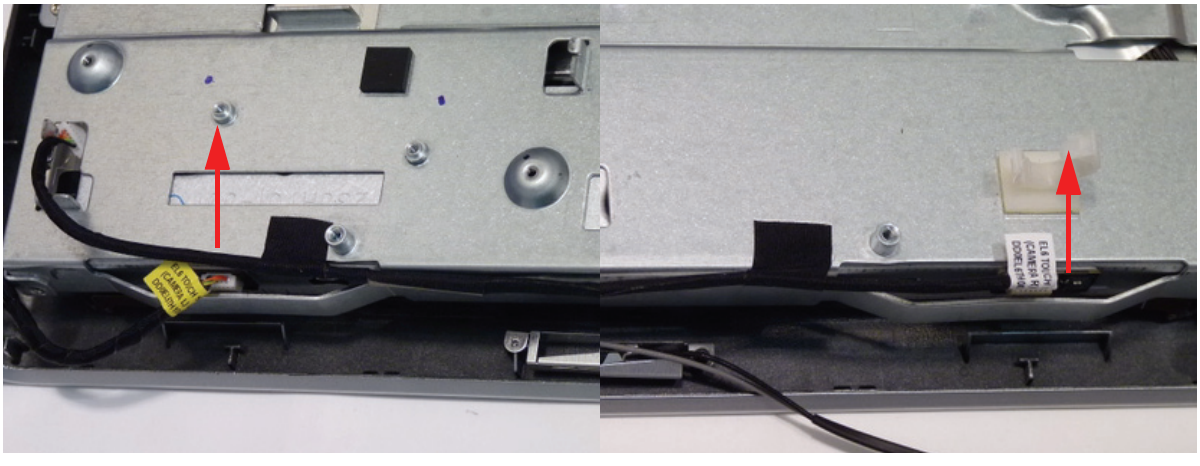


10. Remove the adhesive tape from the sensor cables.

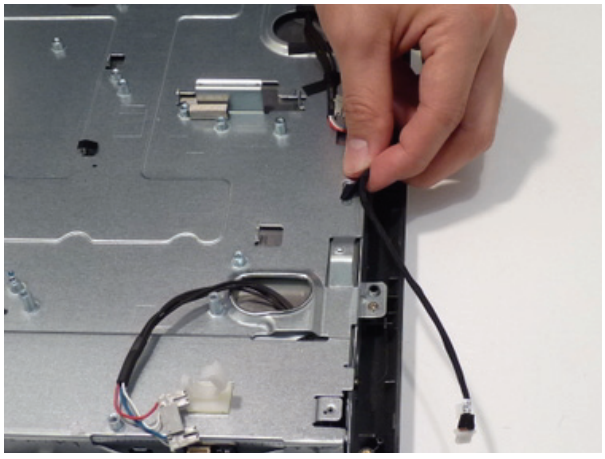




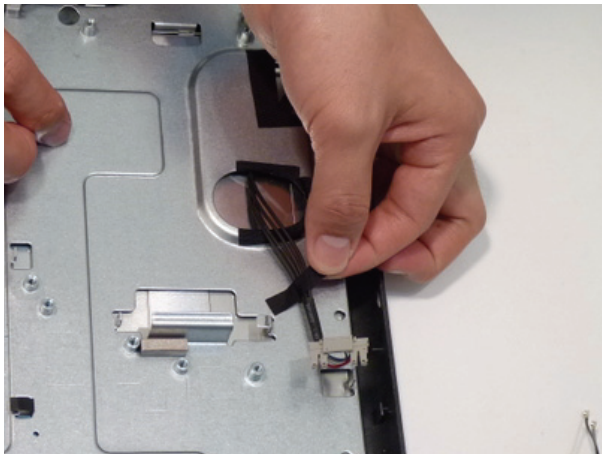
11. Remove the two (2) sensor connectors.



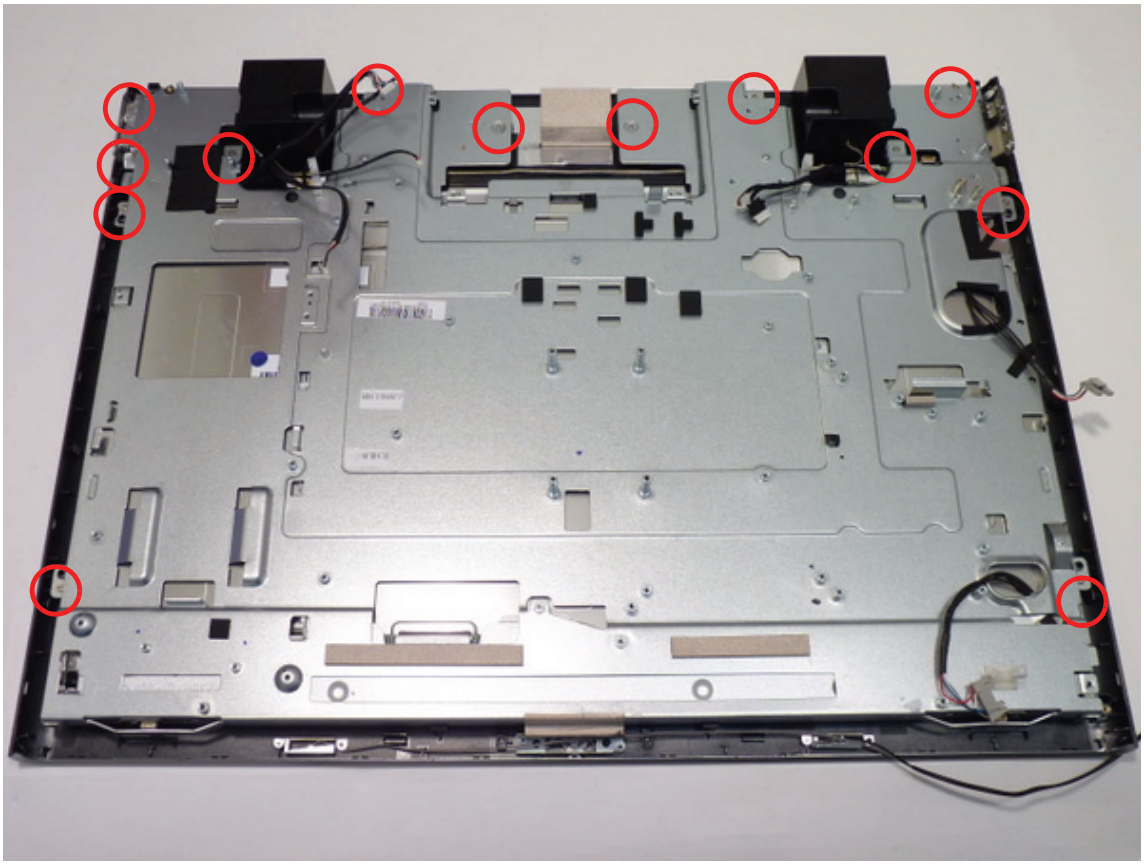
12. Remove the adhesive tape covering the TBD cable and remove.



13. Remove the adhesive tape covering the inverter cable.



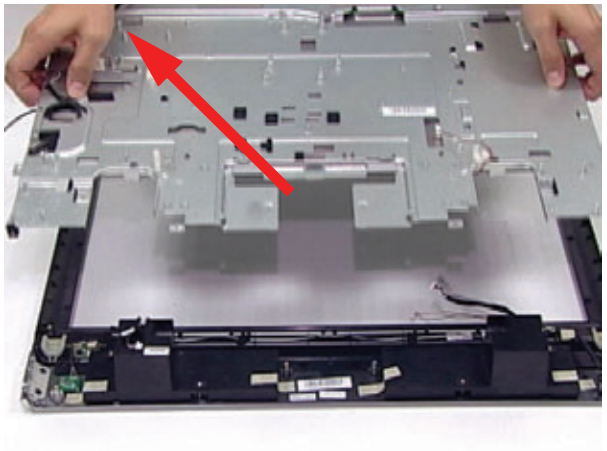
14. Remove the thirteen (13) screws.



Step	Size	Quantity	Screw Type
Frame	M2.5*4	13	

15. Lift the LCD bracket clear of the bezel.

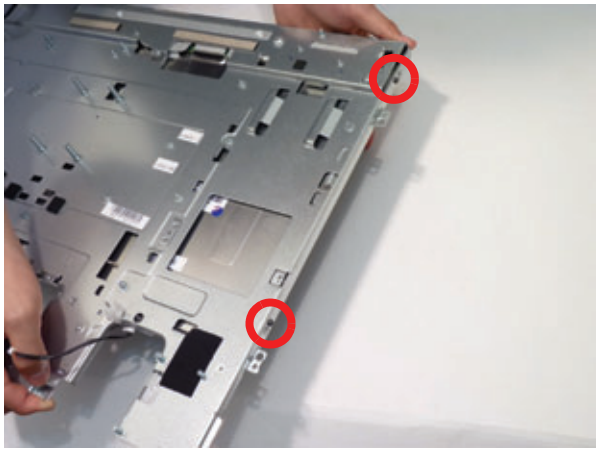
WARNING: When lifting the LCD Assembly, do not touch the Touch sensor modules located at the top left and top right corners of the device. Doing so will damage the touch screen function.

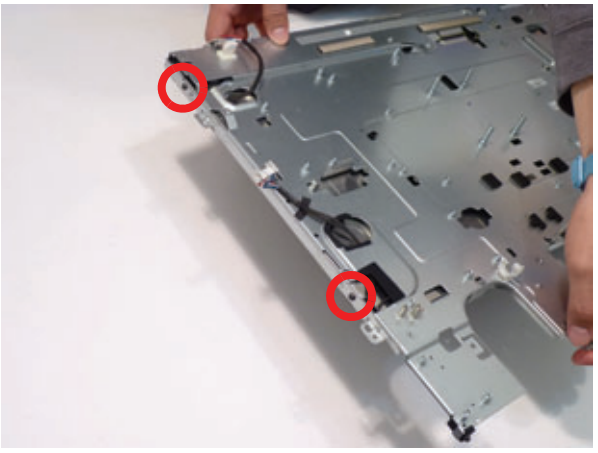


IMPORTANT: Do not place the LCD panel face down. When following the remainder of the disassembly instructions, place something between the LCD face and the tabletop to prevent pressure on the touchscreen sensors.

Removing the LCD Panel

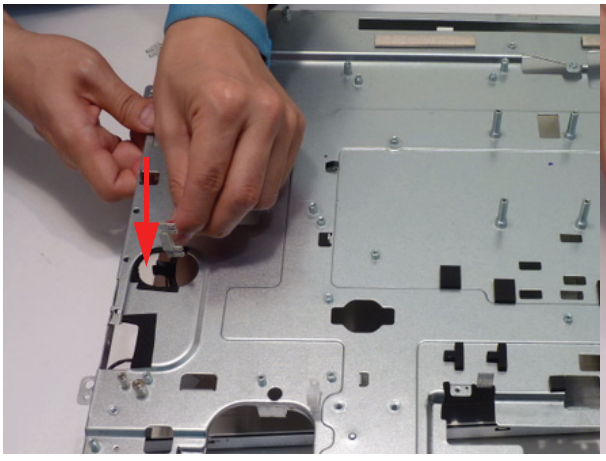
1. See “Removing the Frame” on page 89.
2. Remove the four (4) screws from the LCD assembly.

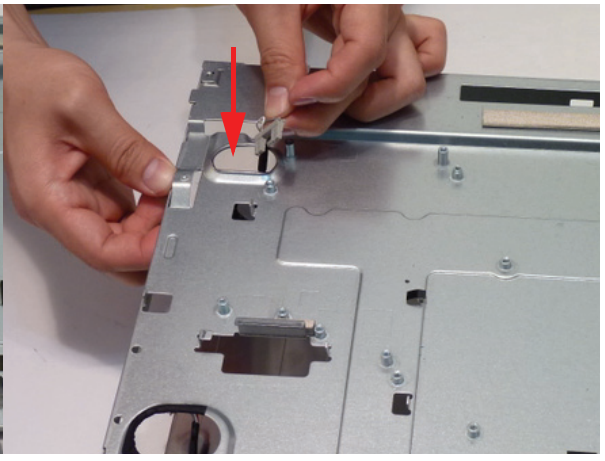




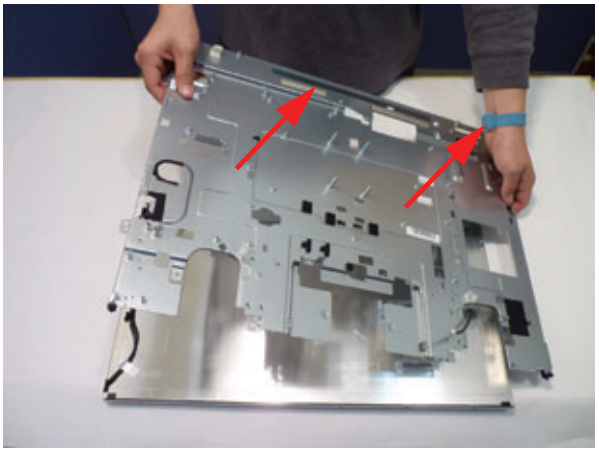
Step	Size	Quantity	Screw Type
LCD Panel	M3*4	4	

3. Lift the edge of the LCD bracket and pass the converter cables through.





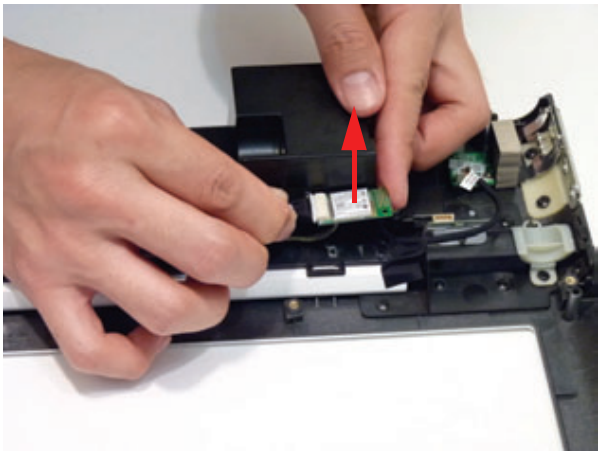
4. Lift the LCD bracket away from the LCD assembly.



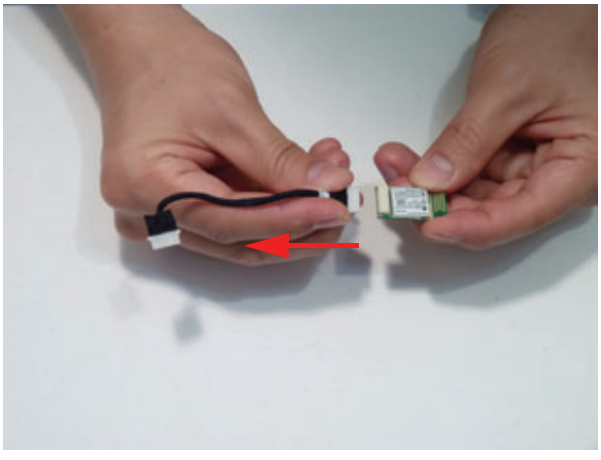
IMPORTANT: The touchscreen control board and LCD panel must be returned together for RMA purposes. See “Removing the Touchscreen Control Board” on page 59. The touchscreen control board records the specific panel’s data, do not separate these for RMA.

Removing the Bluetooth Module

1. See “Removing the Bluetooth Module” on page 97.
2. Lift the Bluetooth module off of the bezel.

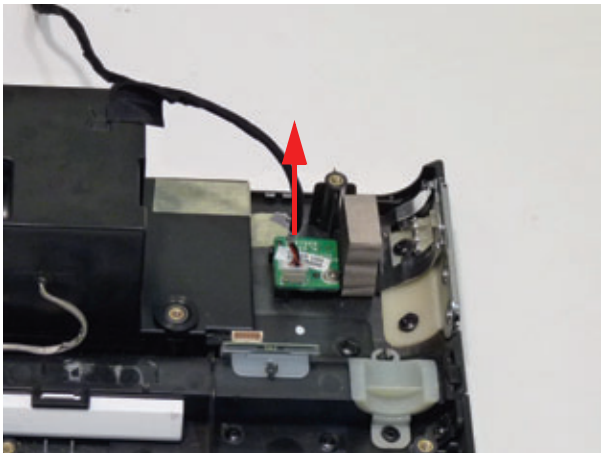


3. Disconnect the Bluetooth cable.

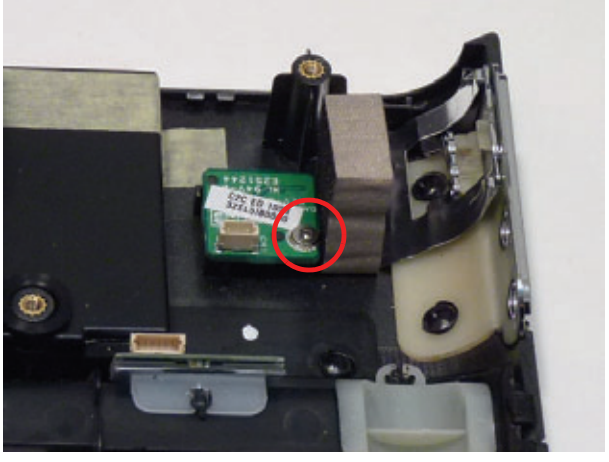


Removing the IR Board

1. See “Removing the Frame” on page 89.
2. Disconnect the home button board cable.

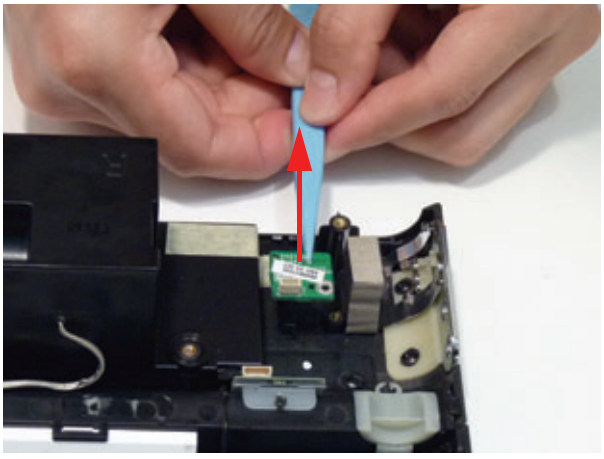


3. Remove the one (1) screw.



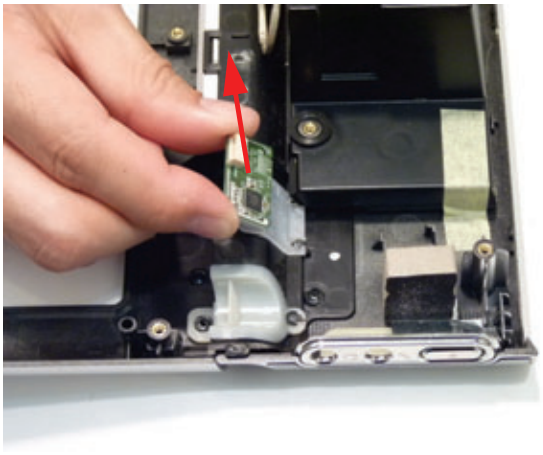
Step	Size	Quantity	Screw Type
Home Board	M2.5*3	1	

4. Remove the home button board from the bezel.



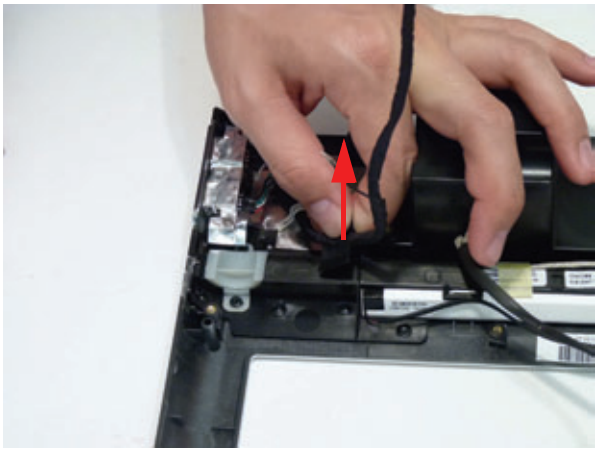
Removing the Home Button Board

1. See “Removing the Frame” on page 89.
2. Lift the power board away from the bezel.

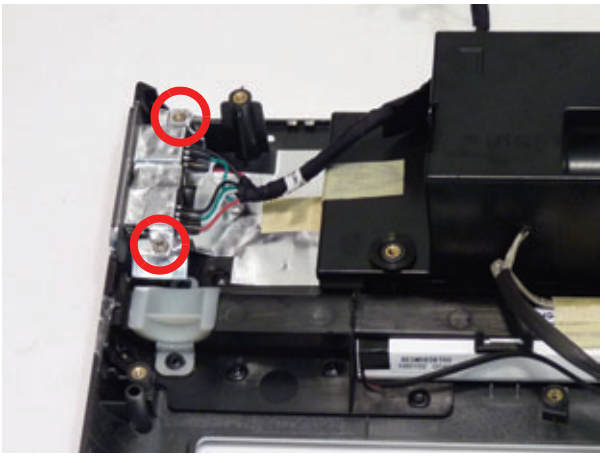


Removing the USB Board

1. See “Removing the Back Cover” on page 48.
2. Remove the adhesive tape covering the USB cable.

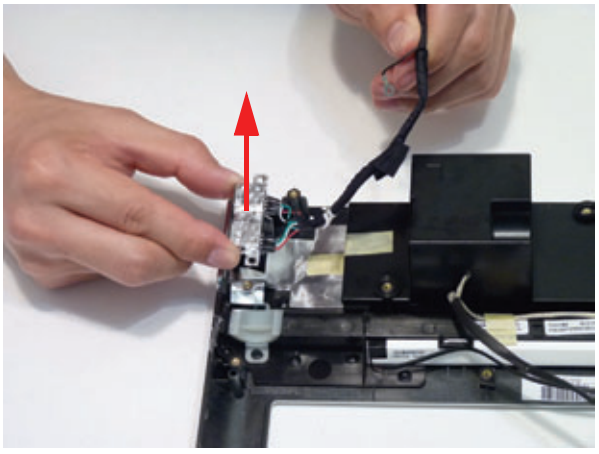


3. Remove the two (2) screws.



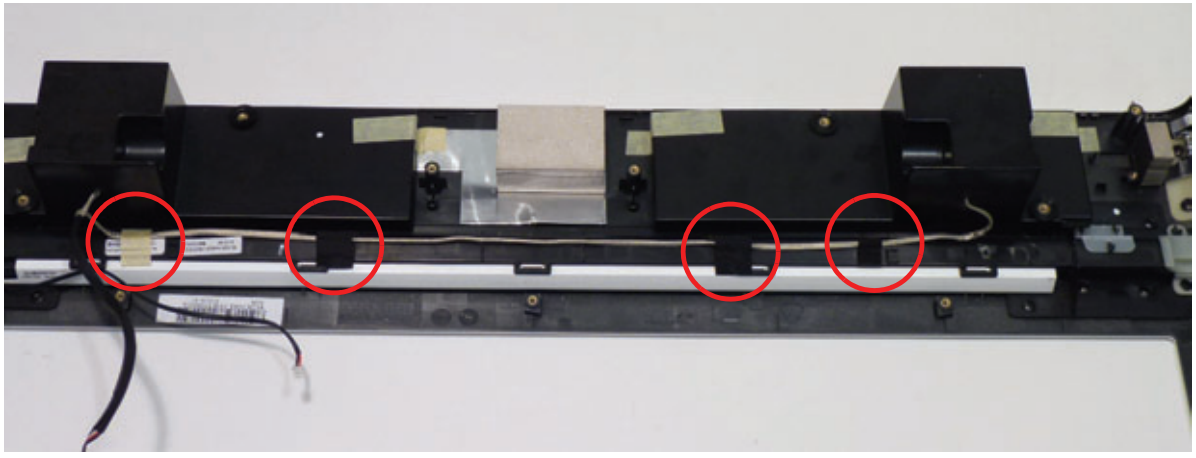
Step	Size	Quantity	Screw Type
USB Board	M2.5*4	2	

4. Remove the USB board from the chassis.

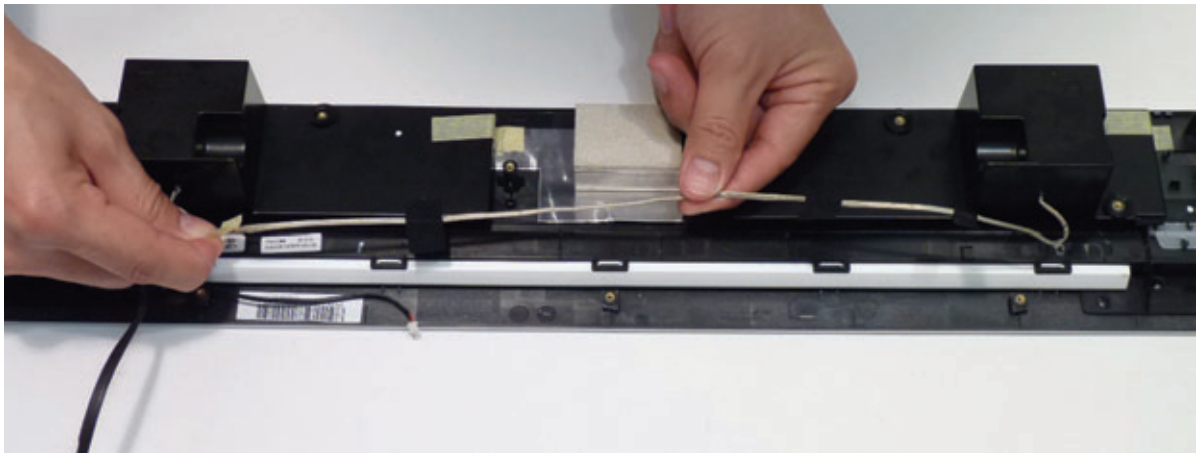


Removing the Speakers

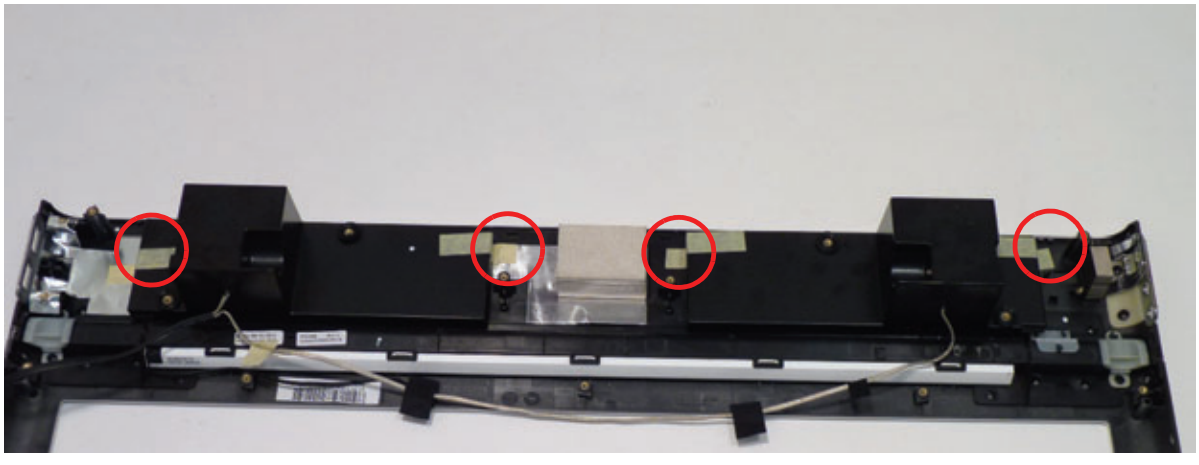
1. See “Removing the Frame” on page 89.
2. Remove the adhesive tape from the speaker cable.



3. Remove the speaker cable from the LCD bezel.



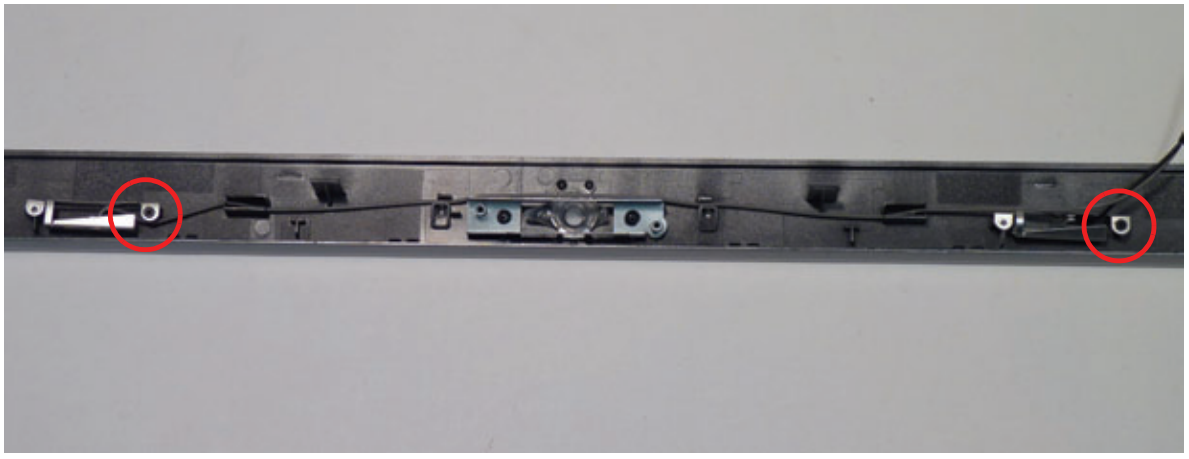
4. Remove the adhesive tape from the speaker assembly.



5. Lift the speakers away from the bezel.

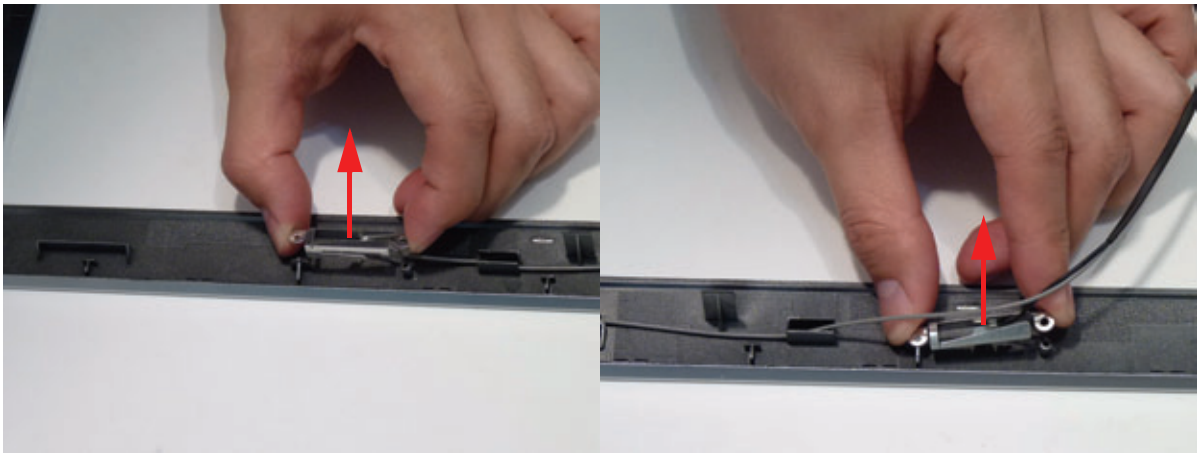
Removing the Antennas

1. See “Removing the Frame” on page 89.
2. Remove the two (2) screws.



Step	Size	Quantity	Screw Type
Antennas	M1.7*4	2	

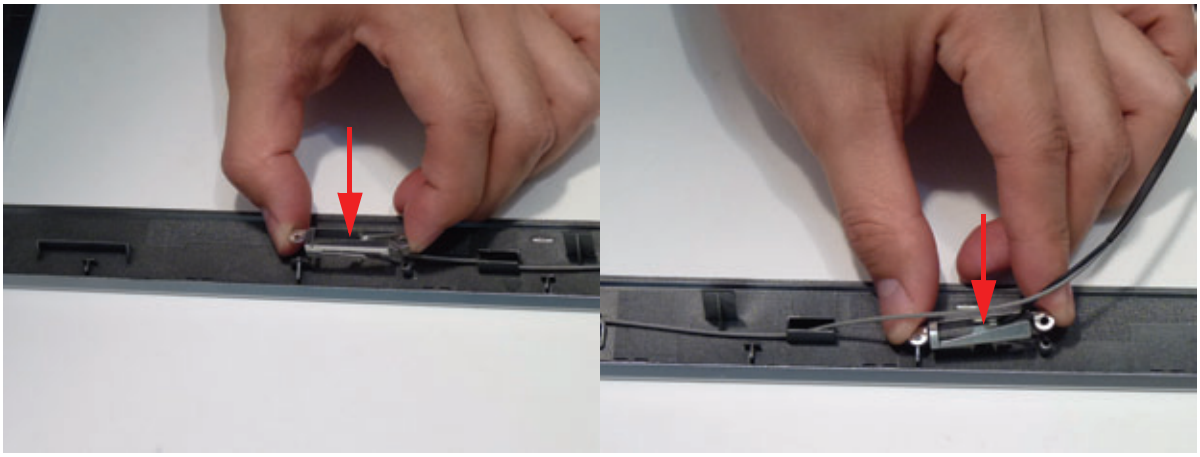
3. Remove the left and right antennas from the bezel.



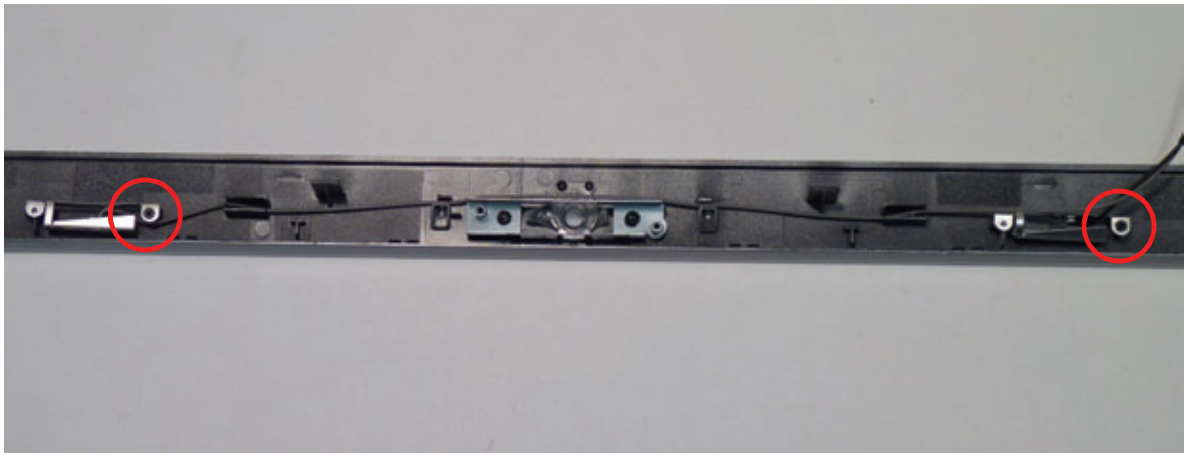
Reassembly Procedure

Replacing the Antennas

4. Replace the left and right antennas onto the bezel.



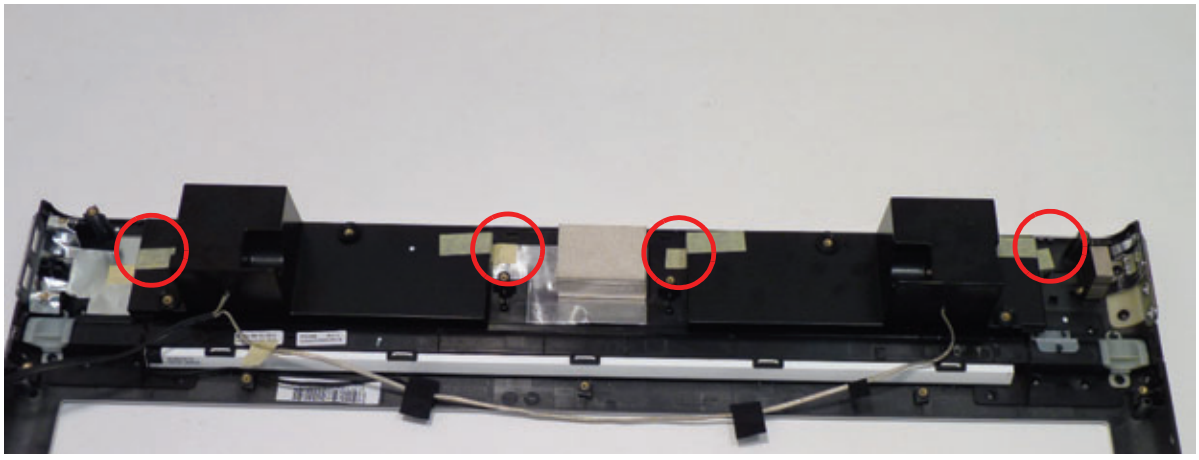
5. Replace the two (2) screws.



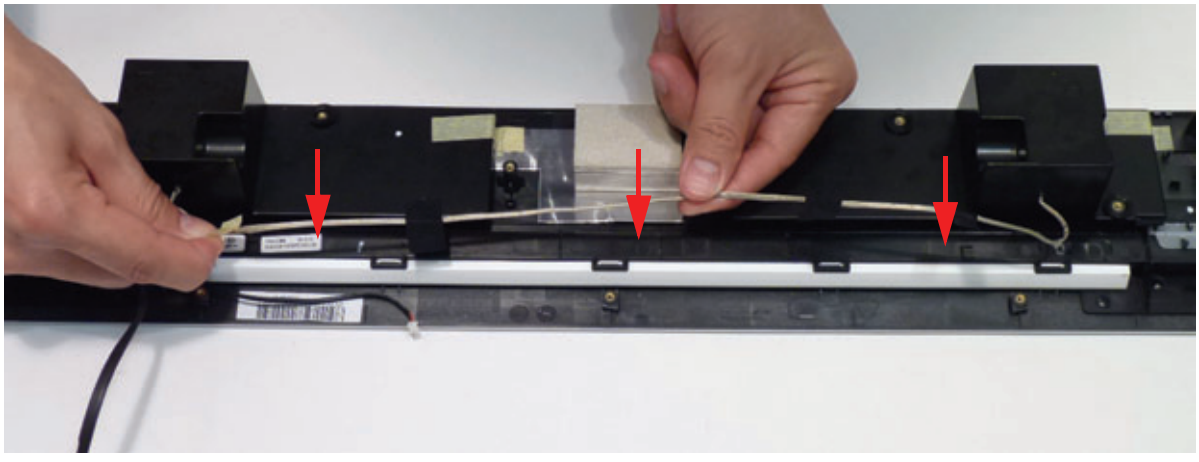
Step	Size	Quantity	Screw Type
Antennas	M1.7*4	2	

Replacing the Speakers

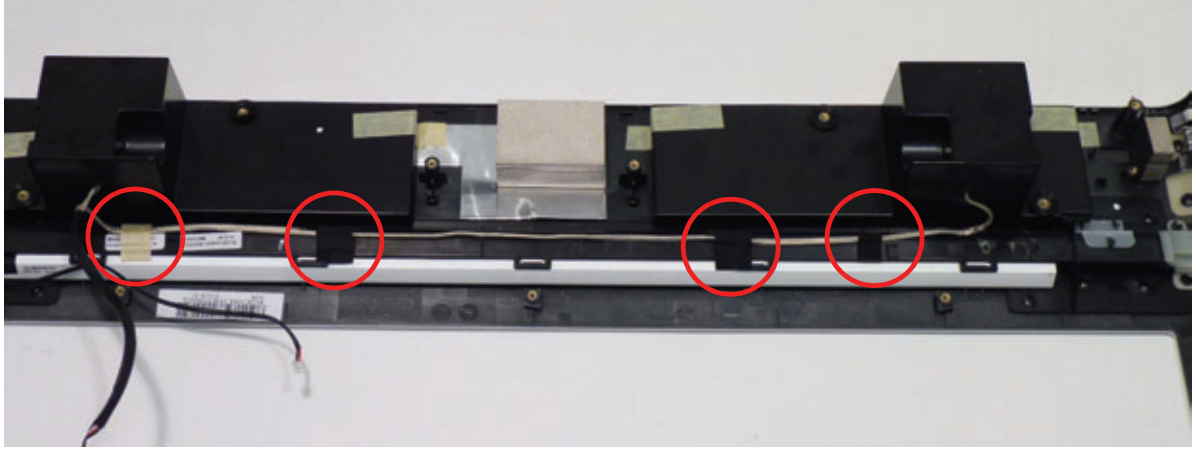
1. Place the speakers onto the LCD bezel and apply the adhesive tape to secure the assembly.



2. Place the speaker cable onto the LCD bezel.

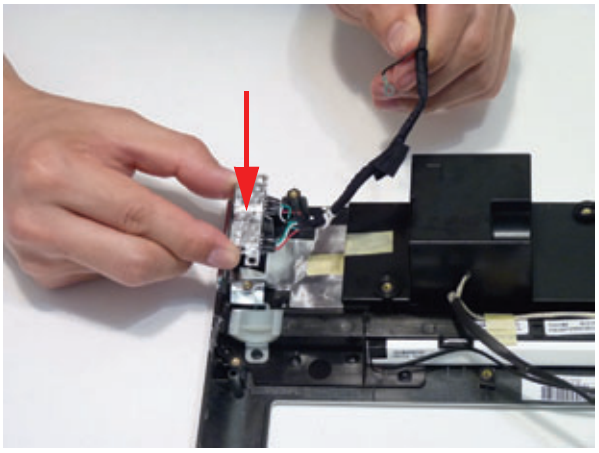


3. Place the adhesive tape to secure the speaker cable.

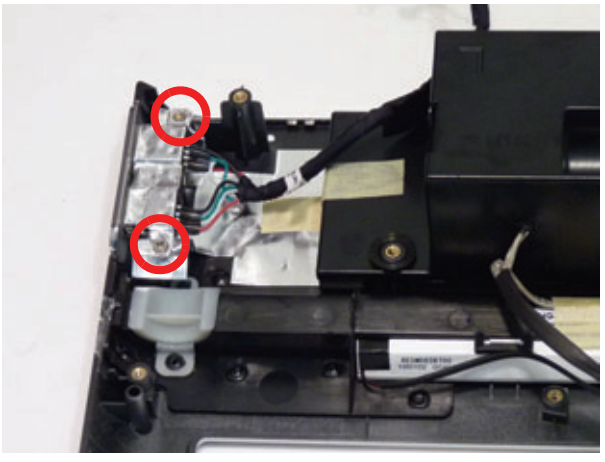


Replacing the USB Board

1. Place the USB board onto the LCD bezel.

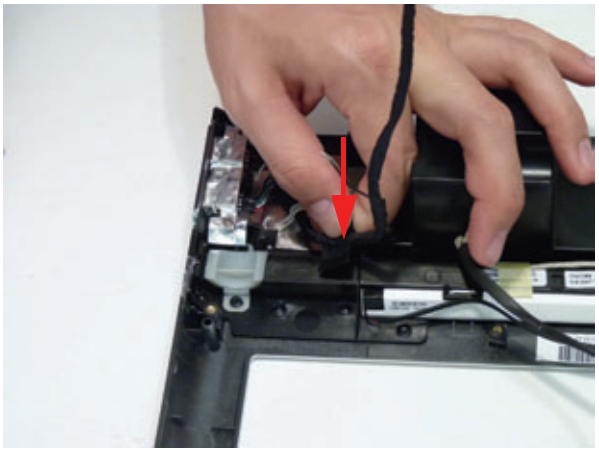


2. Replace the two (2) screws.



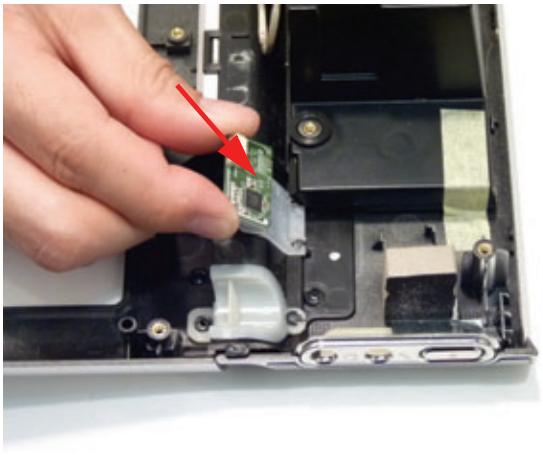
Step	Size	Quantity	Screw Type
USB Board	M2.5*4	2	

3. Replace the adhesive tape to secure the USB cable.

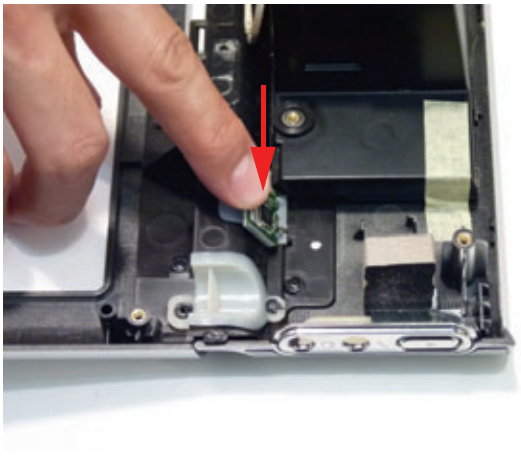


Replacing the IR Board

1. Place the IR board into the LCD bezel.

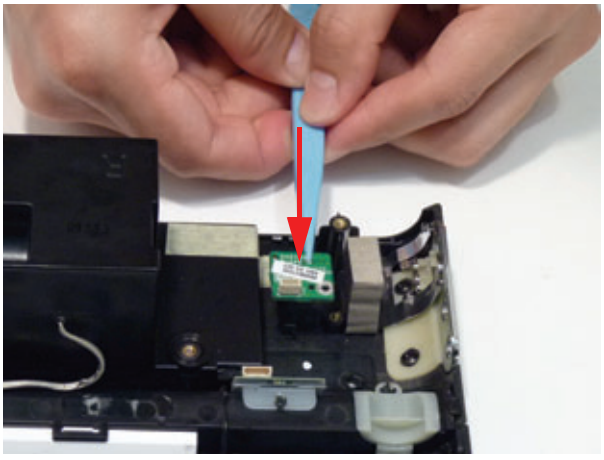


2. Apply pressure to set the adhesive.

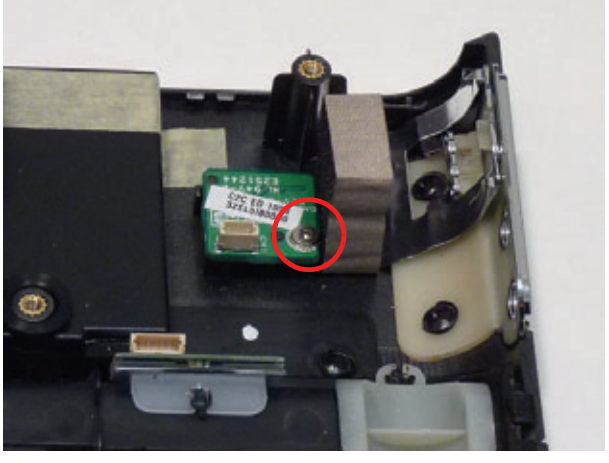


Replacing the Home Button Board

1. Place the home button board onto the LCD bezel.

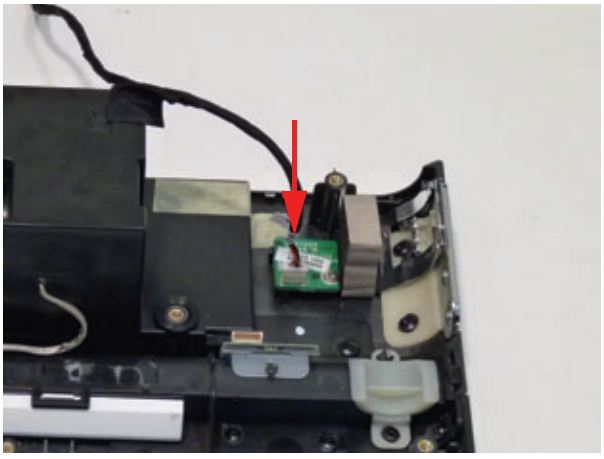


2. Replace the one (1) screw.



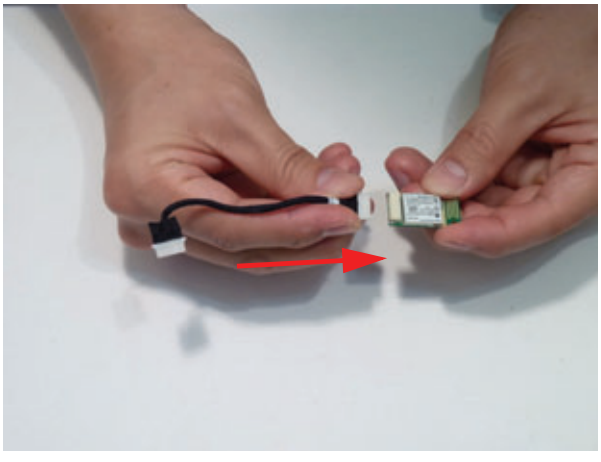
Step	Size	Quantity	Screw Type
Home Board	M2.5*3	1	

3. Connect the home button board cable.

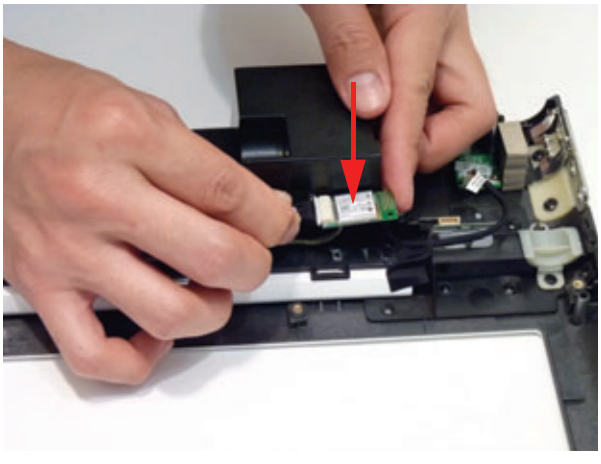


Replacing the Bluetooth Module

1. Connect the Bluetooth cable to the Bluetooth Module.

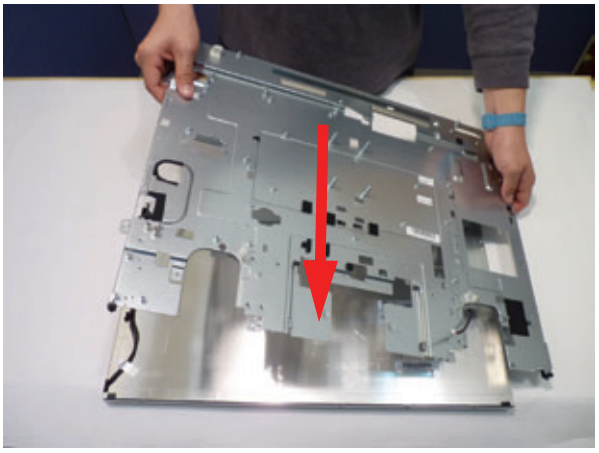


2. Adhere the Bluetooth module to the bezel.

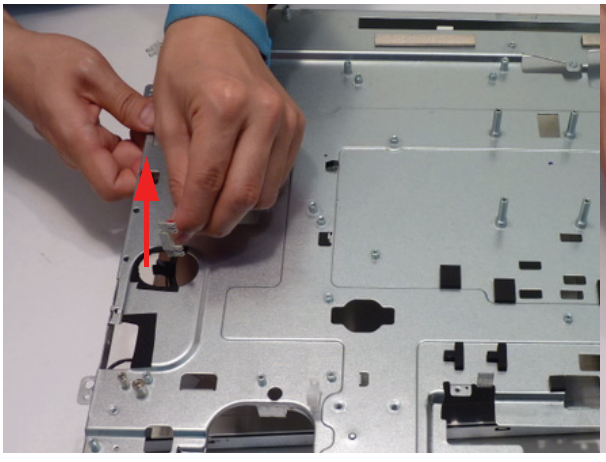


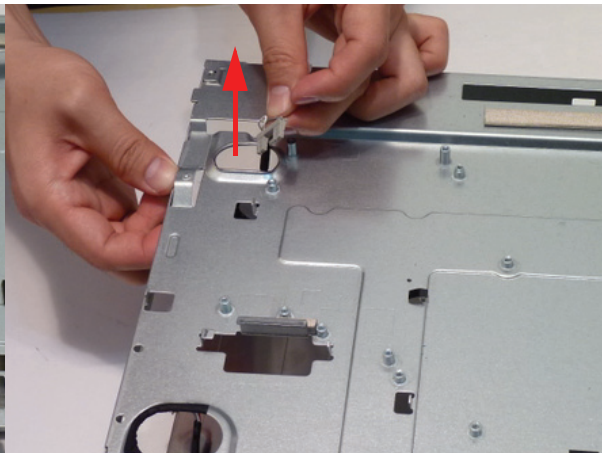
Replacing the LCD Panel in the Frame

1. Replace the LCD panel onto the frame.

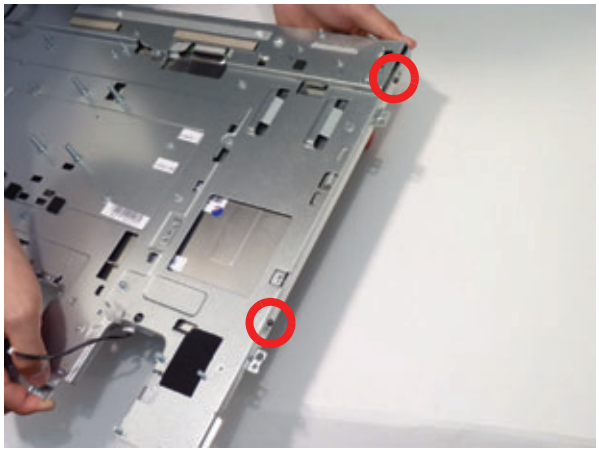


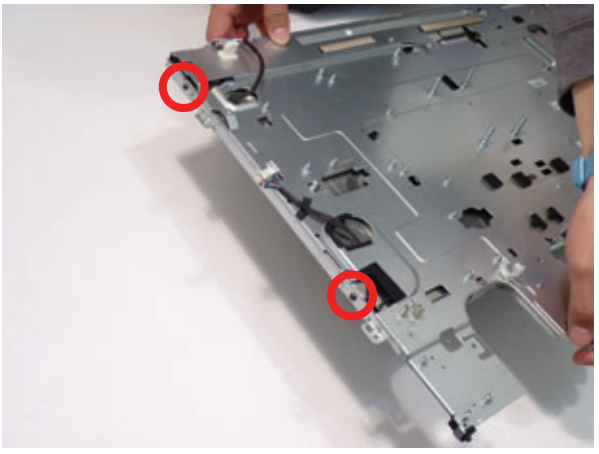
2. Lower the edge of the LCD bracket and pass the converter cables through.





3. Replace the four (4) screws from the LCD assembly.

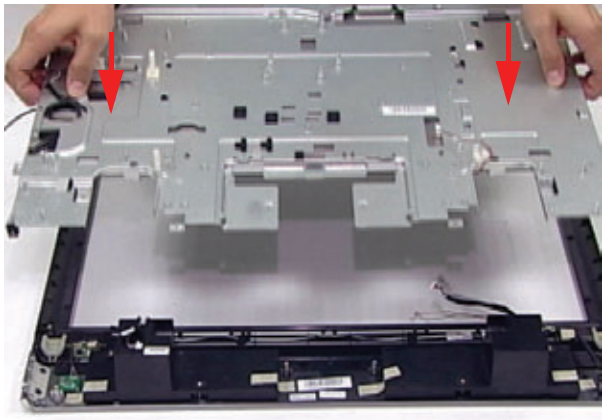




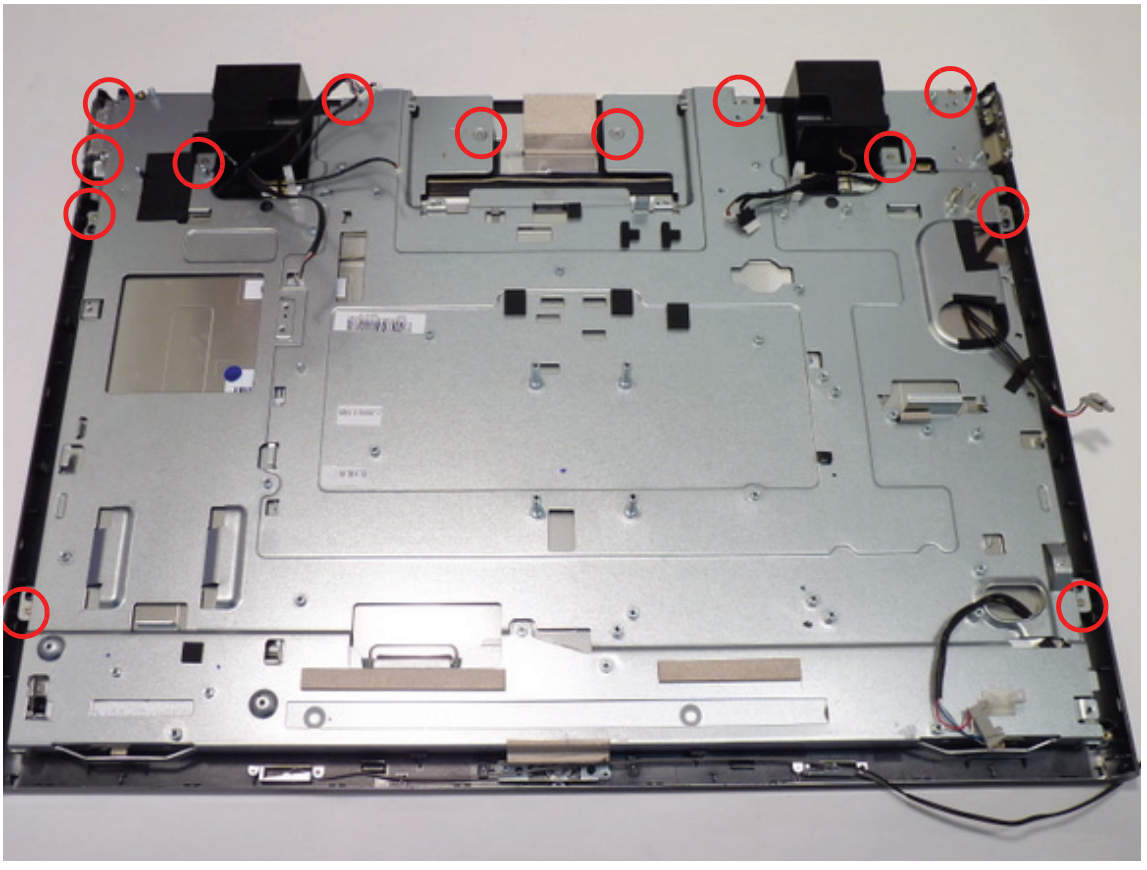
Step	Size	Quantity	Screw Type
LCD Panel	M3*4	4	

Replacing the Frame

1. Place the bezel around a raised surface so that the bezel is lower than the raised surface. Lower the LCD Assembly onto the bezel.

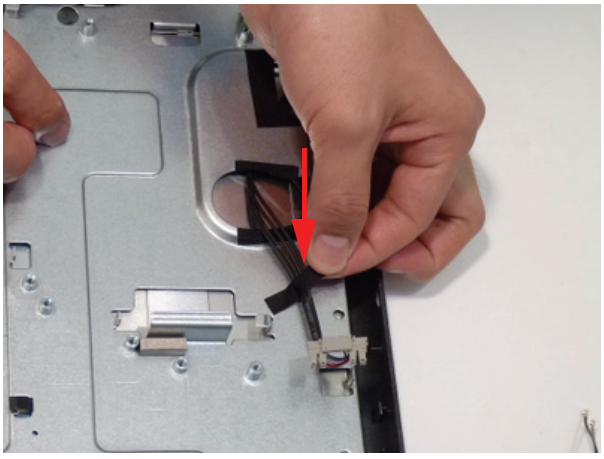


2. Replace the thirteen (13) screws.

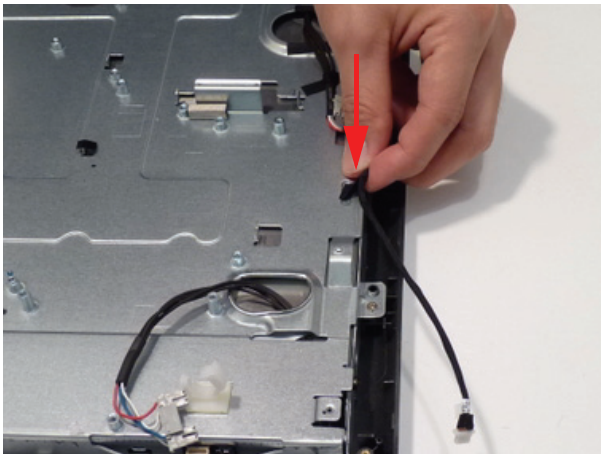


Step	Size	Quantity	Screw Type
Frame	M2.5*4	13	

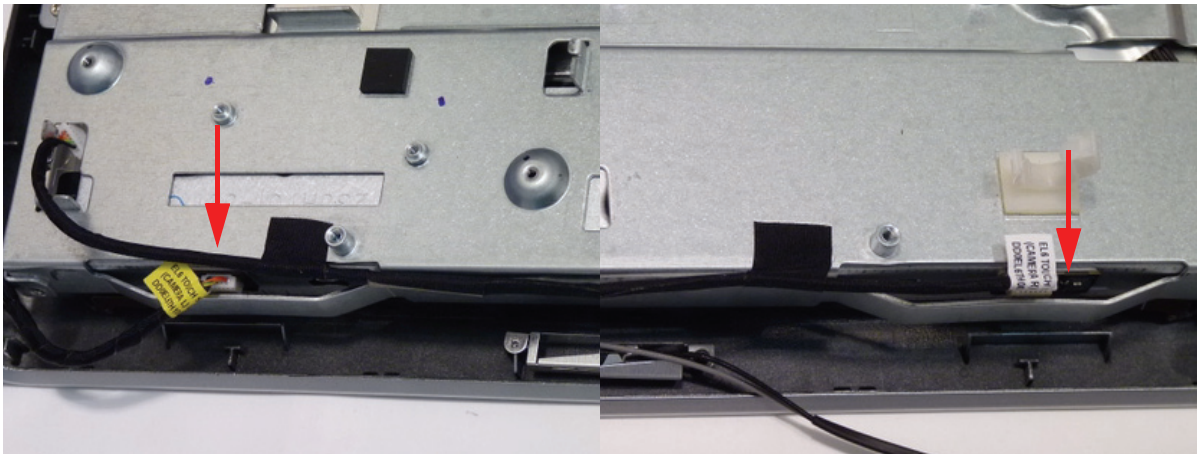
3. Replace the adhesive tape to secure the inverter cable.



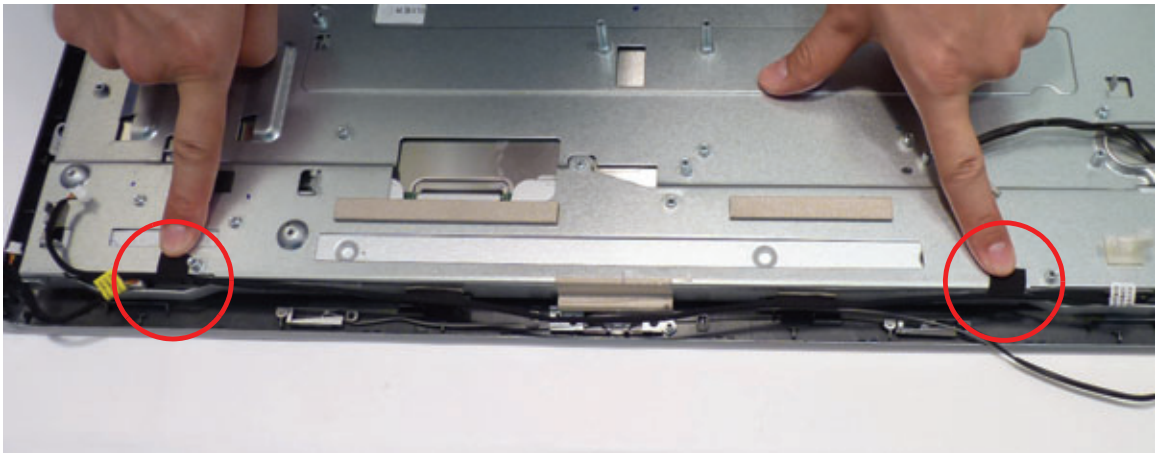
4. Replace the adhesive tape to secure the TBD cable.

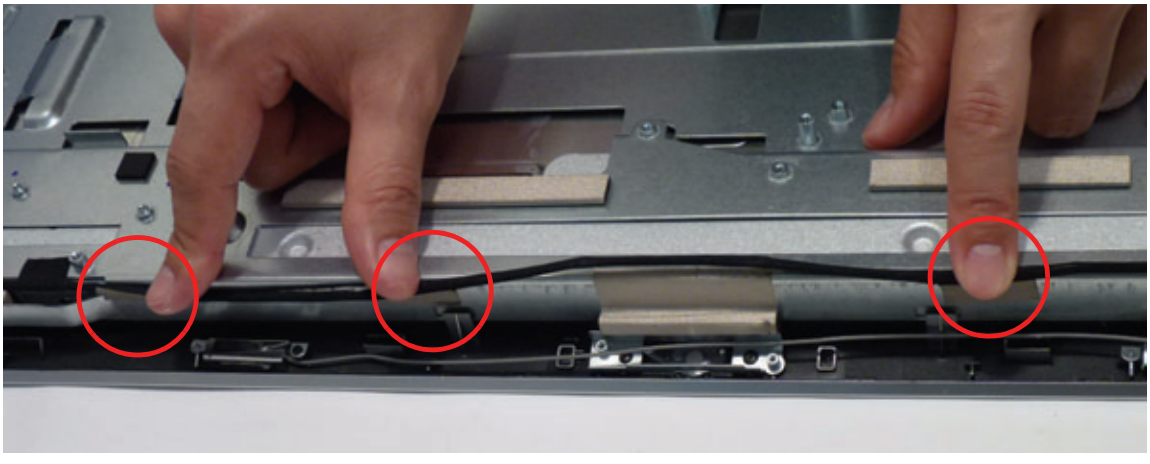


5. Replace the right and left sensor connectors.



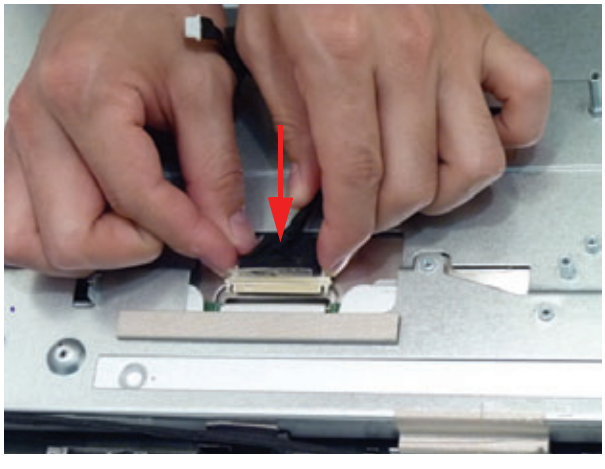
6. Replace the adhesive tape to secure the sensor cables.



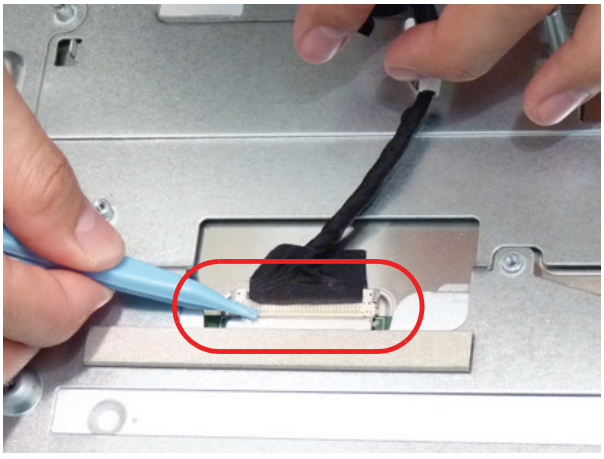


NOTE: There is tape on both the top and side of the LCD bracket.

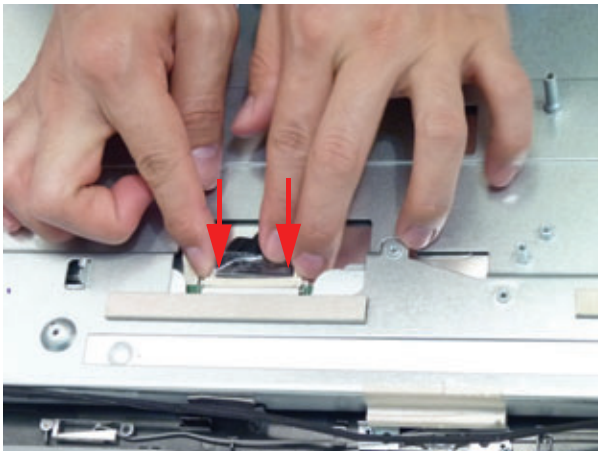
7. Connect the LVDS cable.



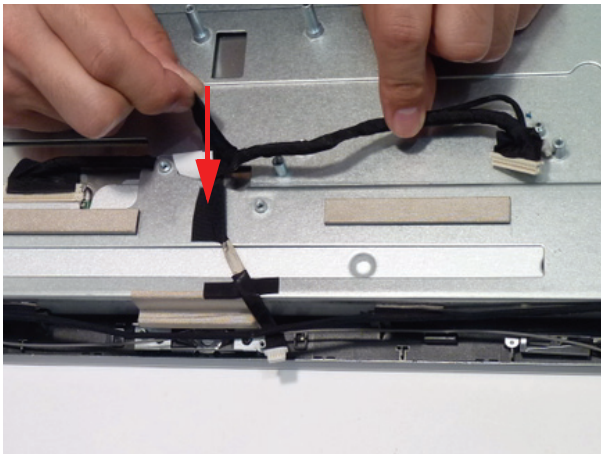
8. Lock the LVDS cable.



9. Adhere the LVDS connector protective cover.

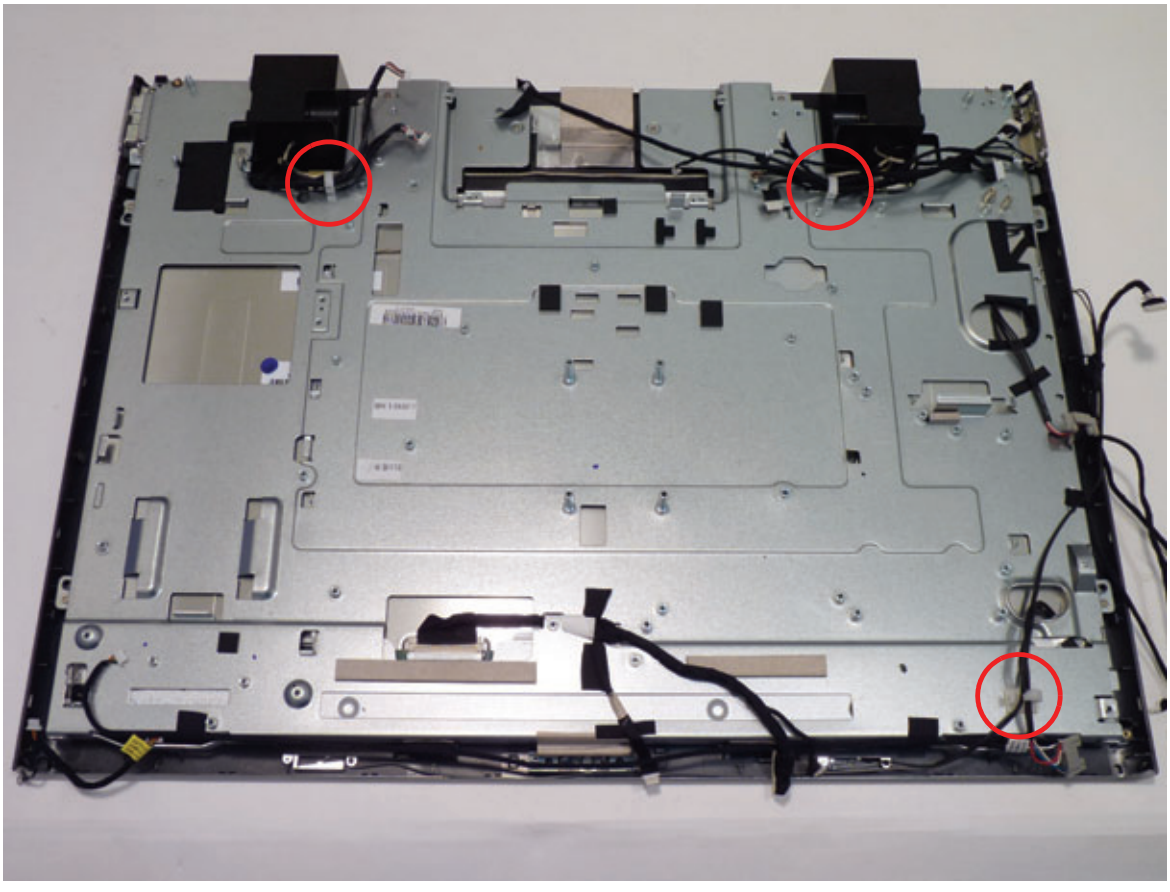


10. Replace the adhesive tape holding the LVDS cable to the LCD bracket.

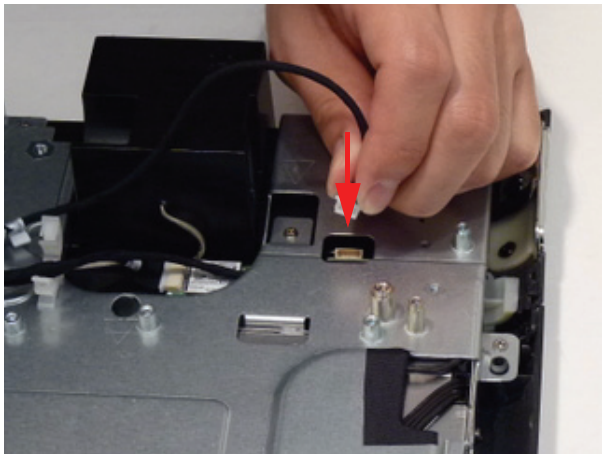


Replacing the Mainboard

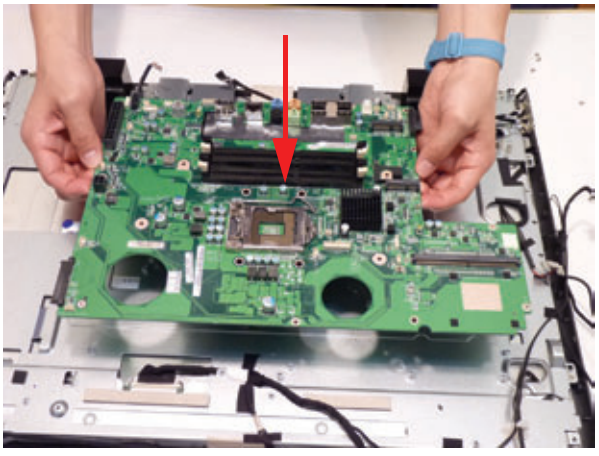
1. Replace all cables into the cable clips and lock them. TBD



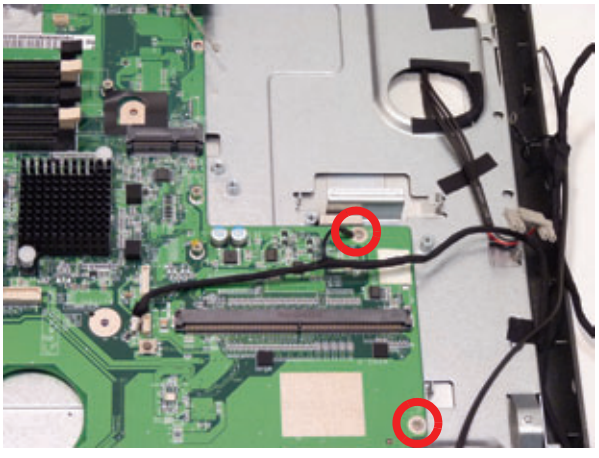
2. Connect the IR Board cable.



3. Place the mainboard onto the chassis.

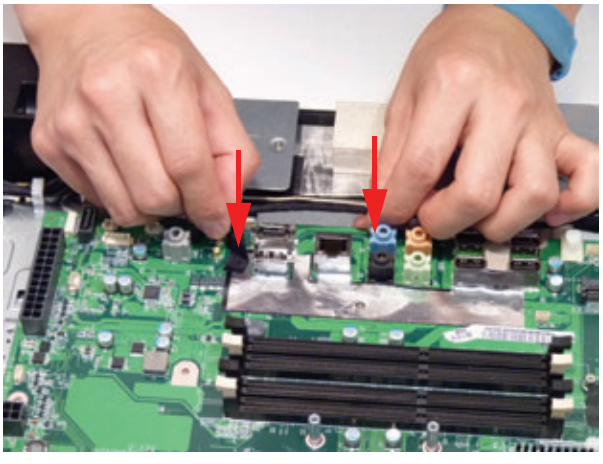


4. Replace the two (2) screws.

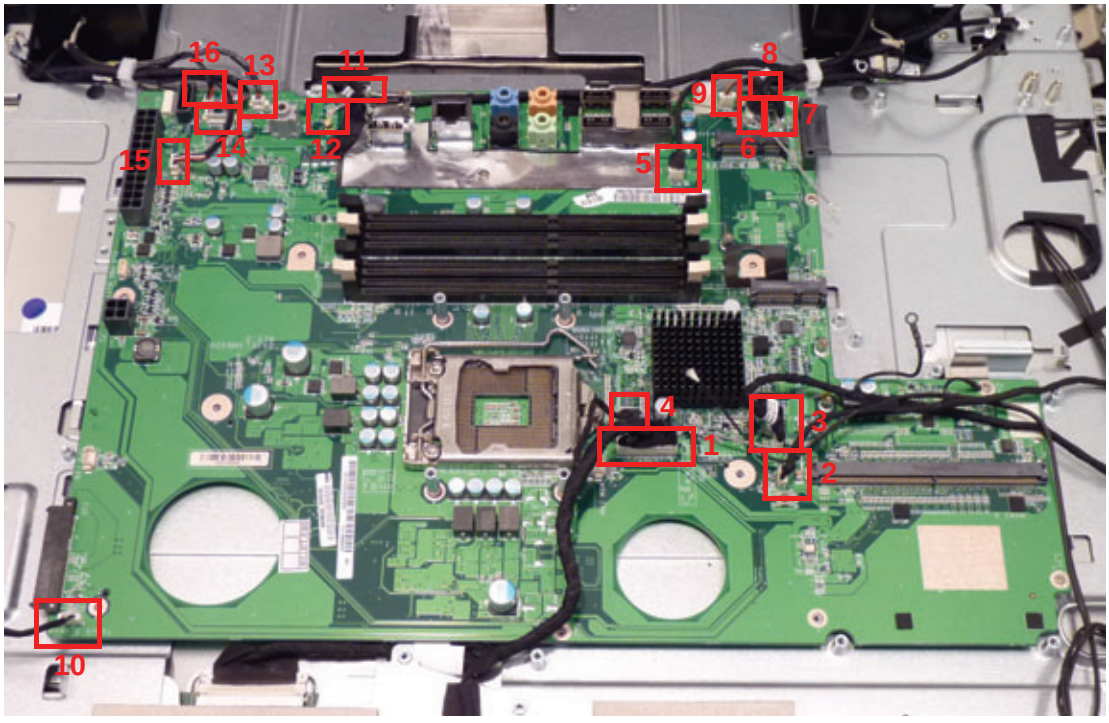


Step	Size	Quantity	Screw Type
Mainboard	M2.5*4	1	

5. Replace the adhesive tabs to secure the Audio board cable to the mainboard.



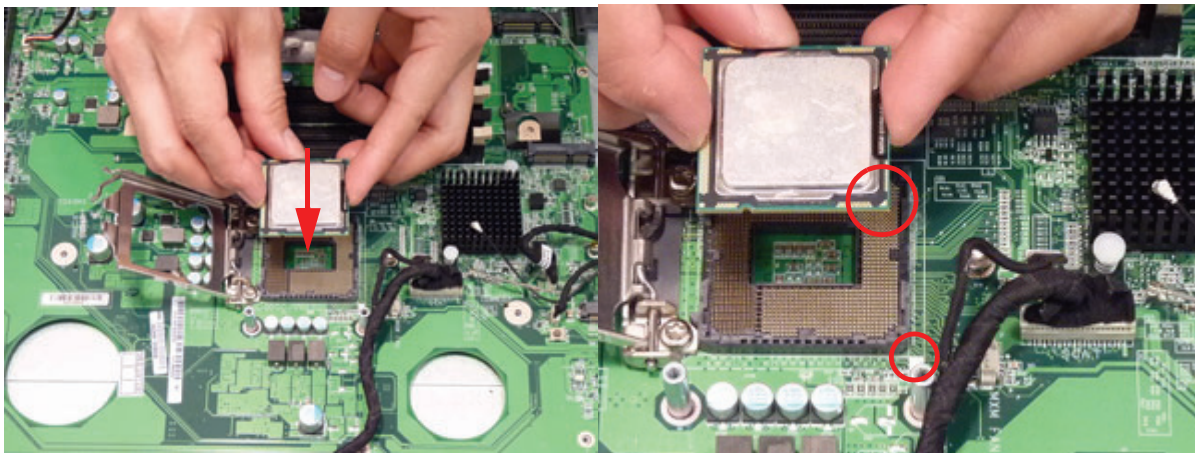
6. Connect the following sixteen (16) cables to the Mainboard as shown.



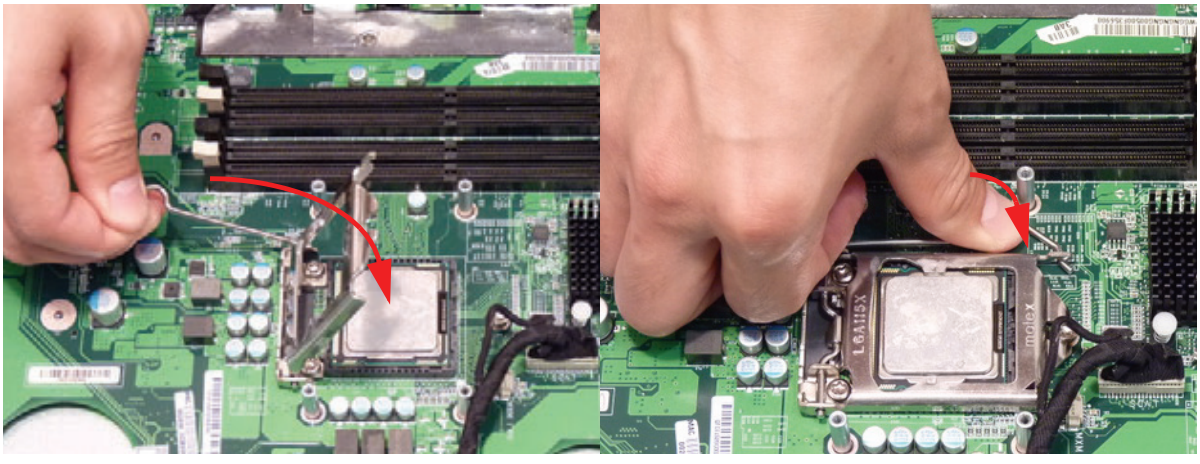
Item	Description
1	LVDS Cable
2	CCD Cable
3	Inverter Cable
4	MIC Cable
5	ODD Button Cable
6	Card Reader Cable
7	Bluetooth Cable
8	Home Button Cable
9	IR Cable
10	Touch Screen
11	Audio Cable
12	TV Tuner Cable
13	Light Foot Cable
14	USB Cable
15	Speaker Cable
16	Light Pipe Cable

Replacing the CPU

1. Place the CPU paying attention to the locating triangle.
   NOTE: Ensure the CPU is lined up with the Pin1 Socket locator on the mainboard.

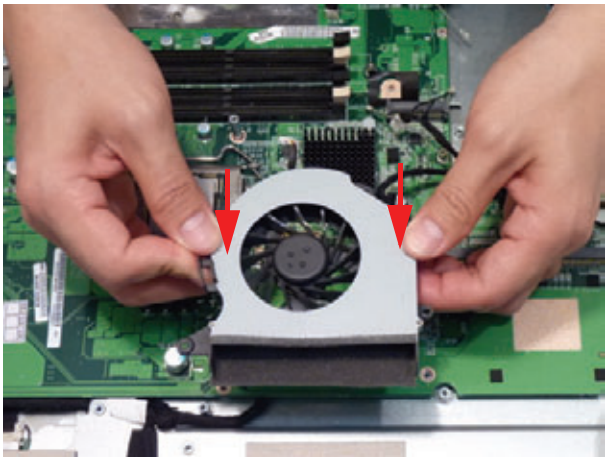


2. Press the latch down and in to lock the CPU.

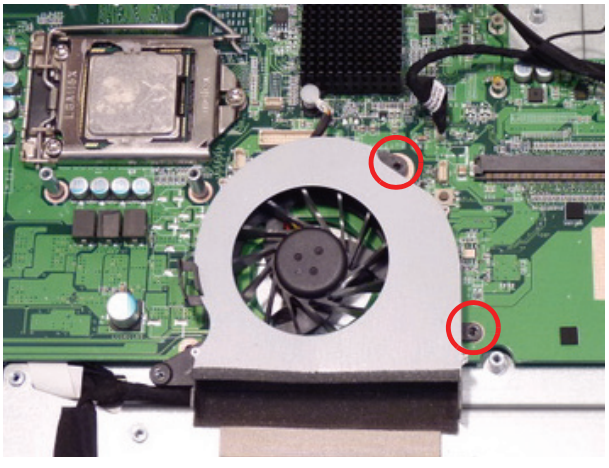


Replacing the Fans

3. Replace the right fan.

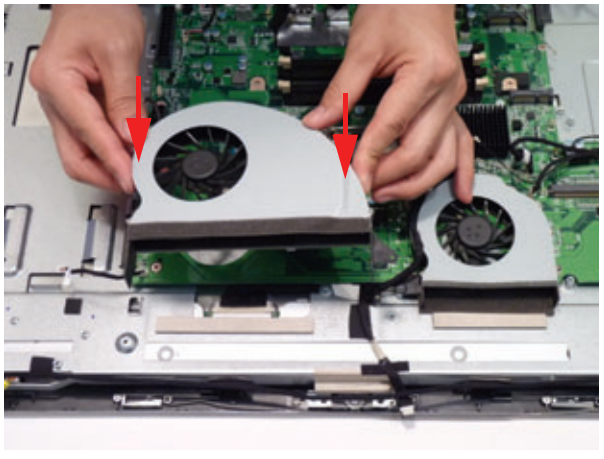


4. Replace the two (2) screws.

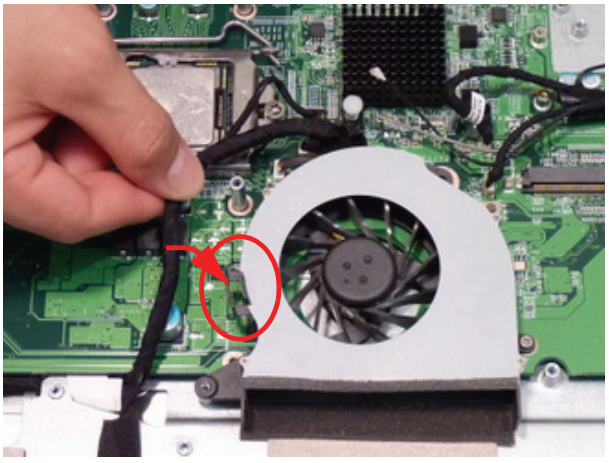


Step	Size	Quantity	Screw Type
Fan	2.5*5	2	

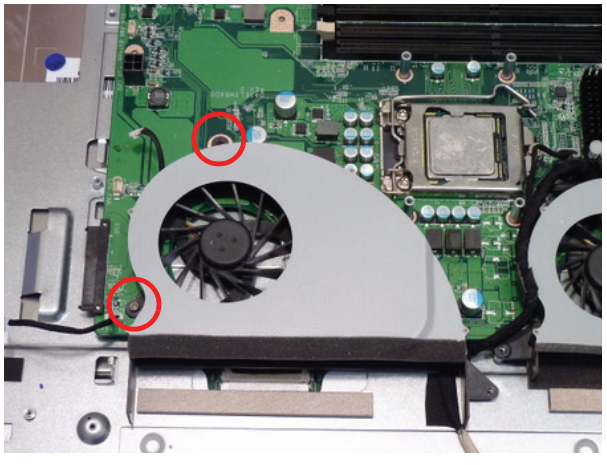
5. Replace the left fan.



6. Place the LVDS cable into the cable clips.



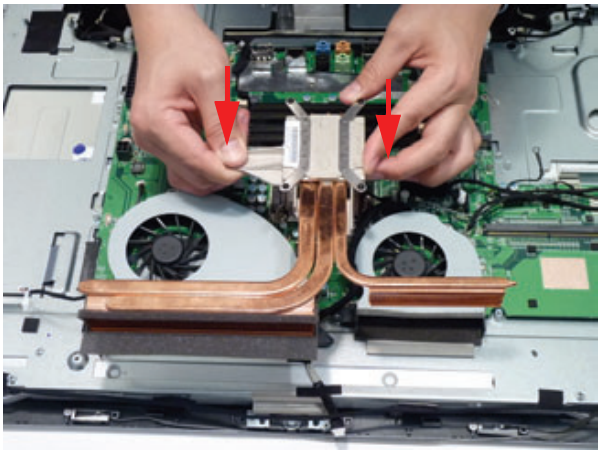
7. Replace the two (2) screws.



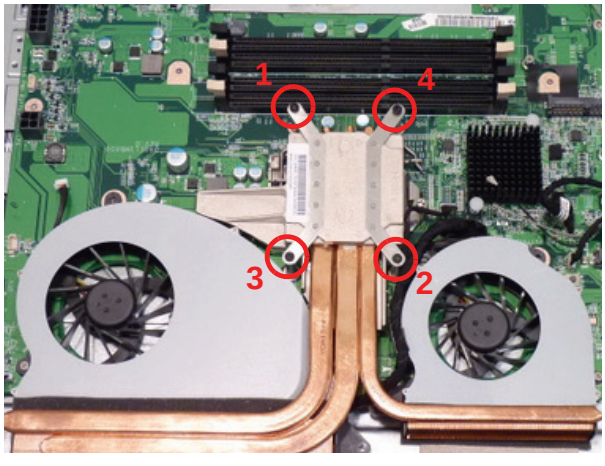
Step	Size	Quantity	Screw Type
Fan	2.5*5	2	

Replacing the Thermal Module

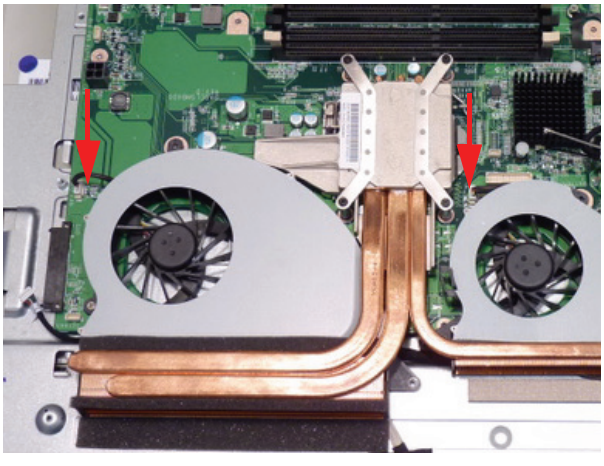
1. Place the thermal module on to the mainboard.



2. Tighten the four (4) captive screws in reverse numerical order (4, 3, 2, then 1).

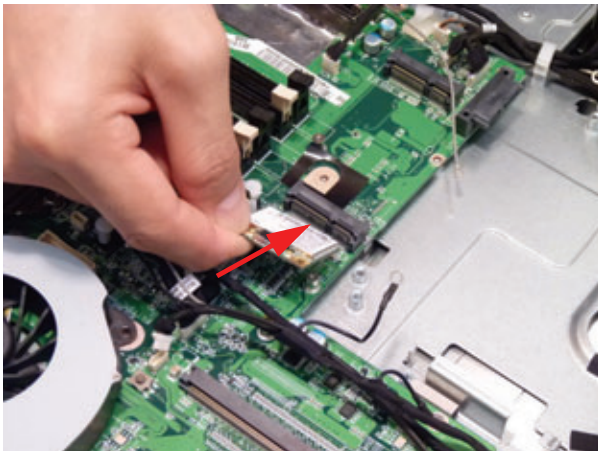


3. Connect the two (2) fan cables.

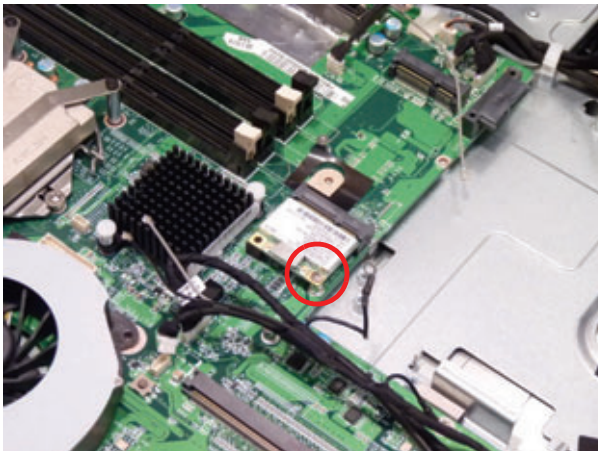


Replacing the WLAN Module

1. Replace the WLAN module.

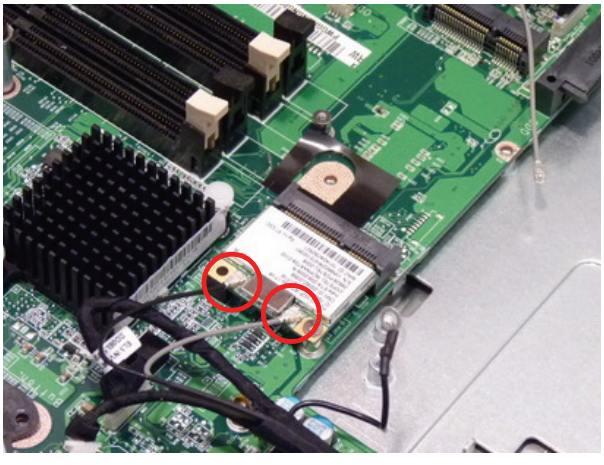


2. Replace the one (1) screw.



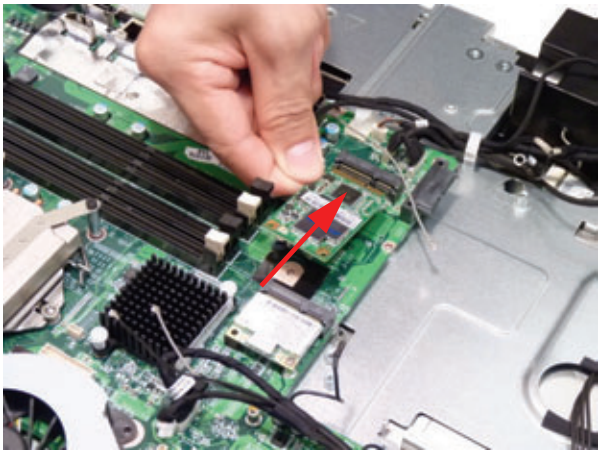
Step	Size	Quantity	Screw Type
WLAN	M2.0*3	1	

3. Replace the two (2) connectors. The black cable is placed closest to the DIMM slots.

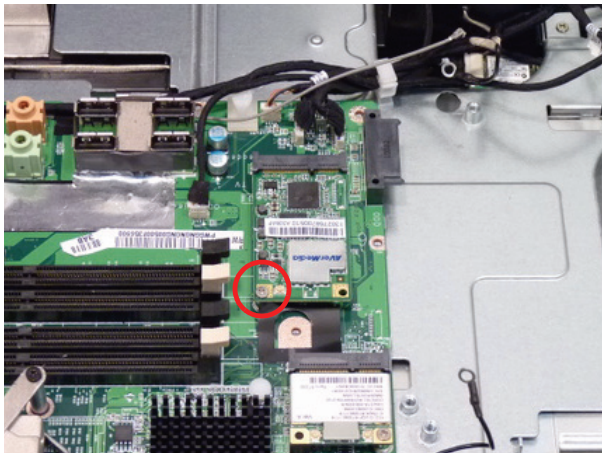


Replacing the TV Tuner Module

1. Place the TV Tuner module into the connector.

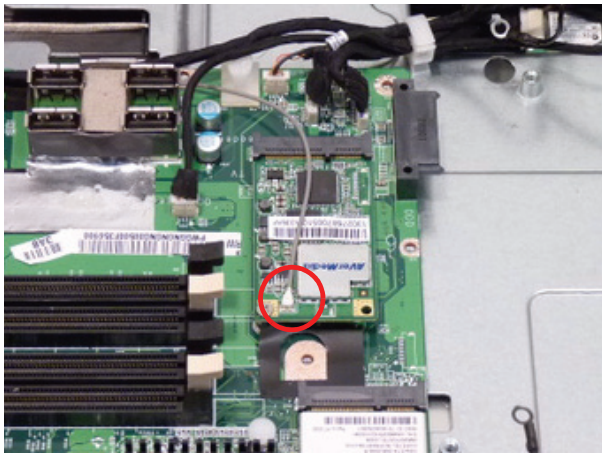


2. Replace the one (1) screw.



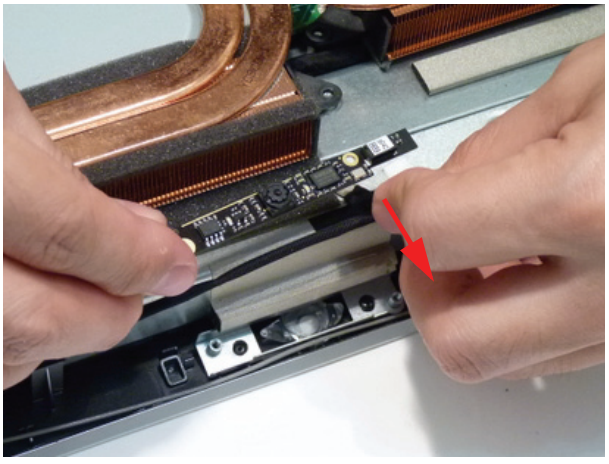
Step	Size	Quantity	Screw Type
TV Card	M2.0*3	1	

3. Connect the TV Tuner cable.

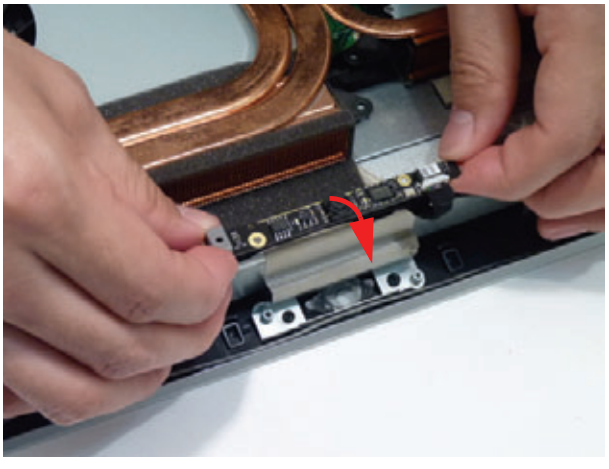


Replacing the Camera Module

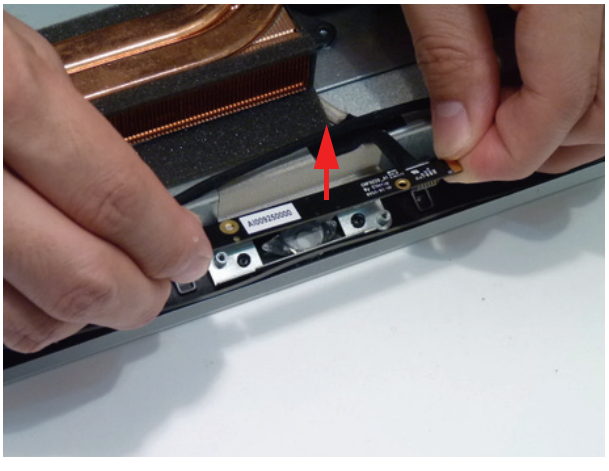
1. Connect the camera cable to the Camera Module.



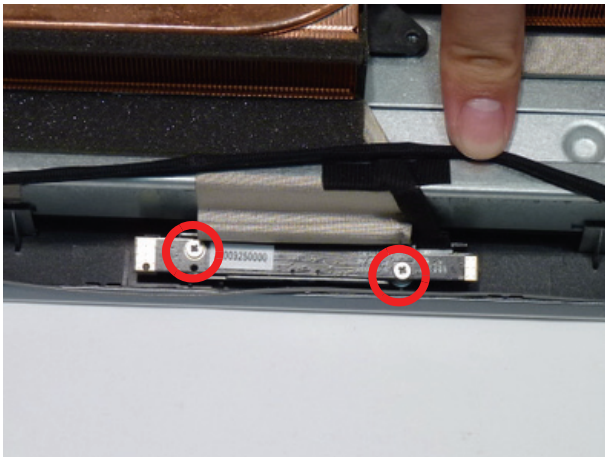
2. Turn the Camera Module over.



3. Place the Camera Module on to the chassis.



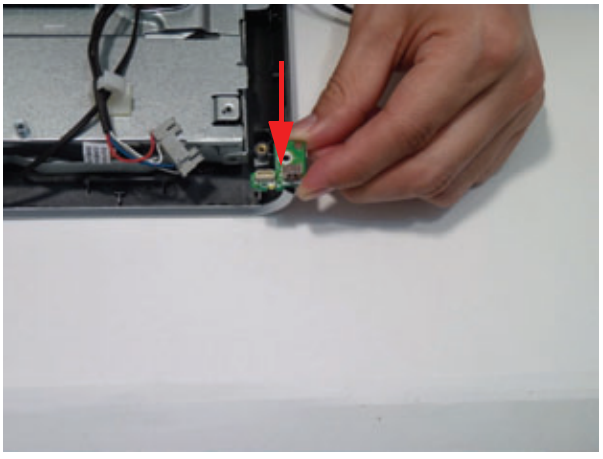
4. Replace the two (2) screws to secure the Camera Module



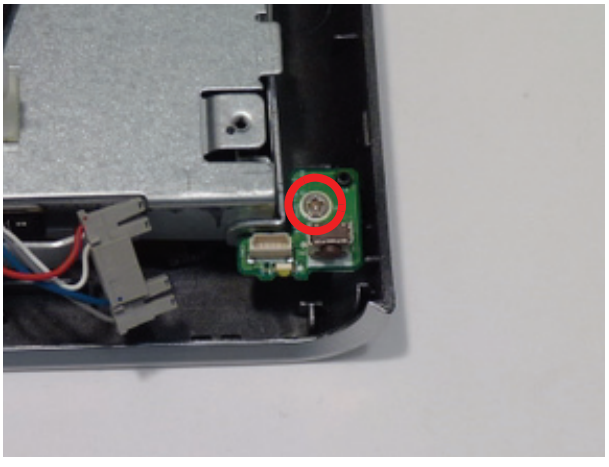
Step	Size	Quantity	Screw Type
Camera Module	M2.0*3	2	

Replacing the Power Board

1. Place the Power Board onto the chassis.

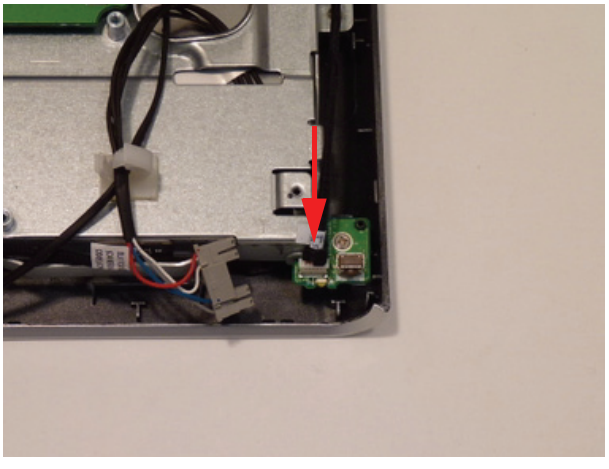


2. Replace the one (1) screw.



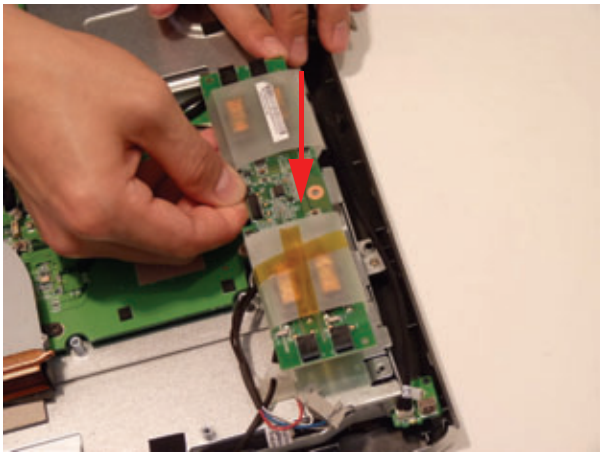
Step	Size	Quantity	Screw Type
Home Button Board	M2.5*4	1	

3. Connect the Home Button board cable.

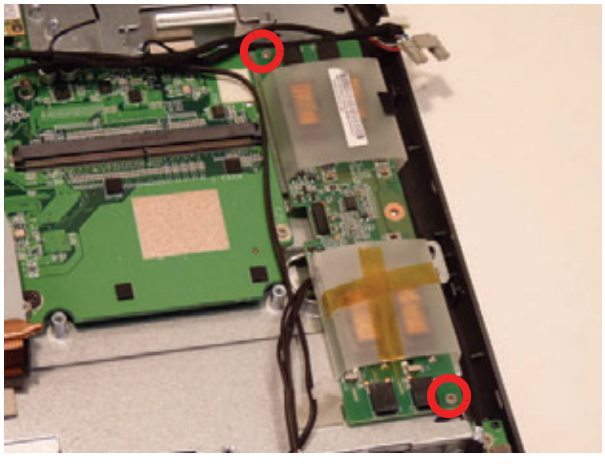


Replacing the Inverter Board

1. Place the Inverter Board onto the chassis.

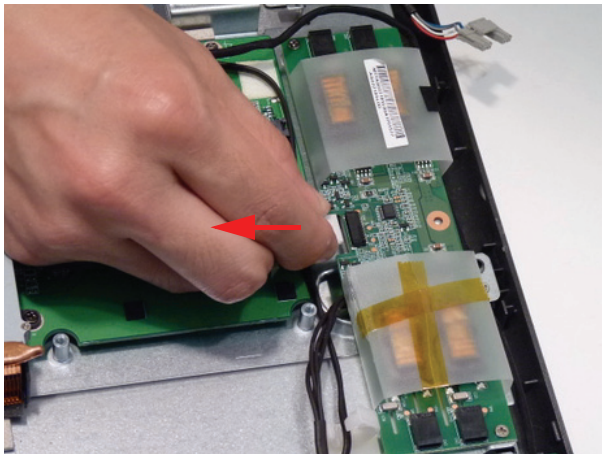


2. Replace the two (2) screws to secure the inverter board.

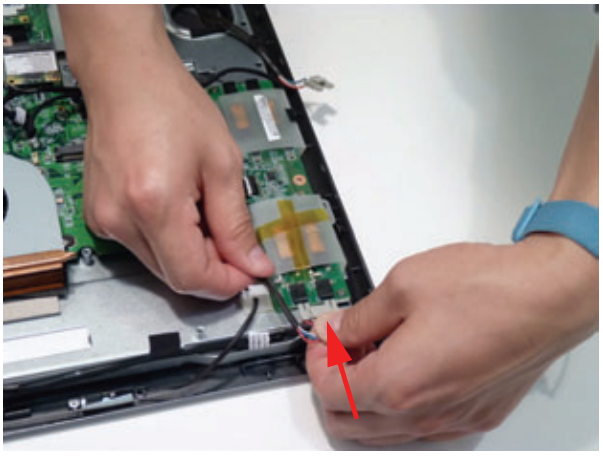


Step	Size	Quantity	Screw Type
Inverter Board	M2.5*3	2	

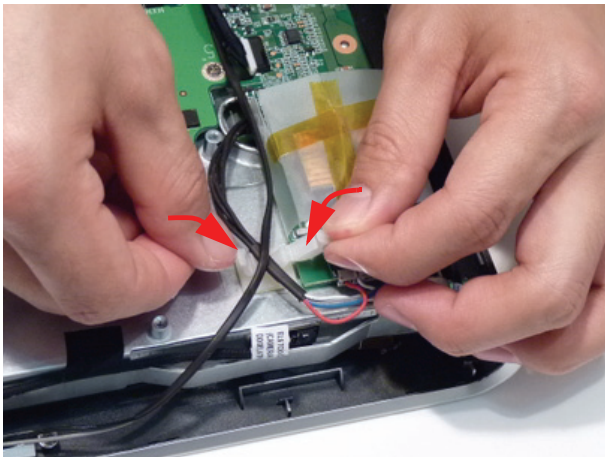
3. Connect the mainboard to inverter cable.



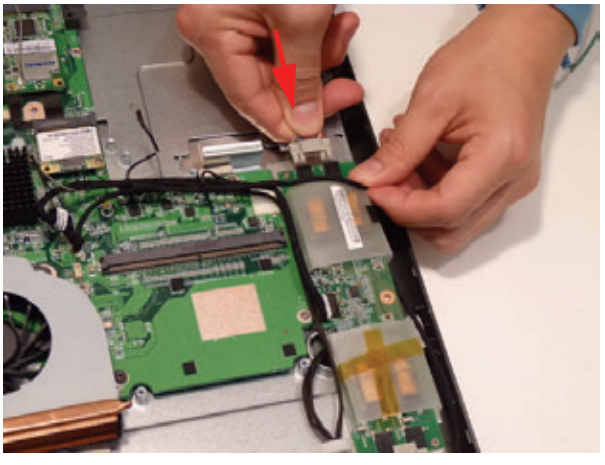
4. Connect the LCD to Inverter Board cable 2.



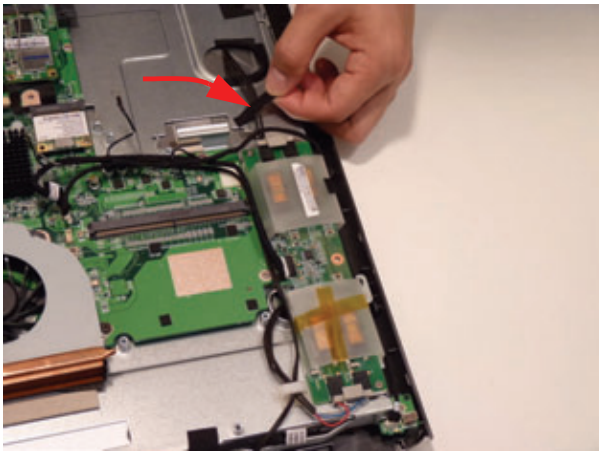
5. Lock the cable clasp.



6. Connect the LCD to Inverter Board cable 1.

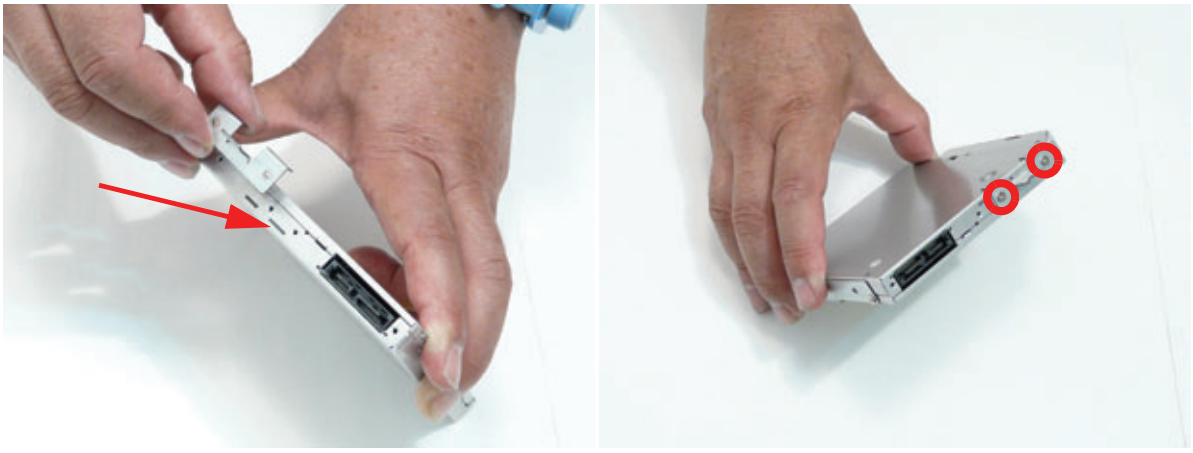


7. Apply the adhesive tape to secure the Inverter Board cable 1.



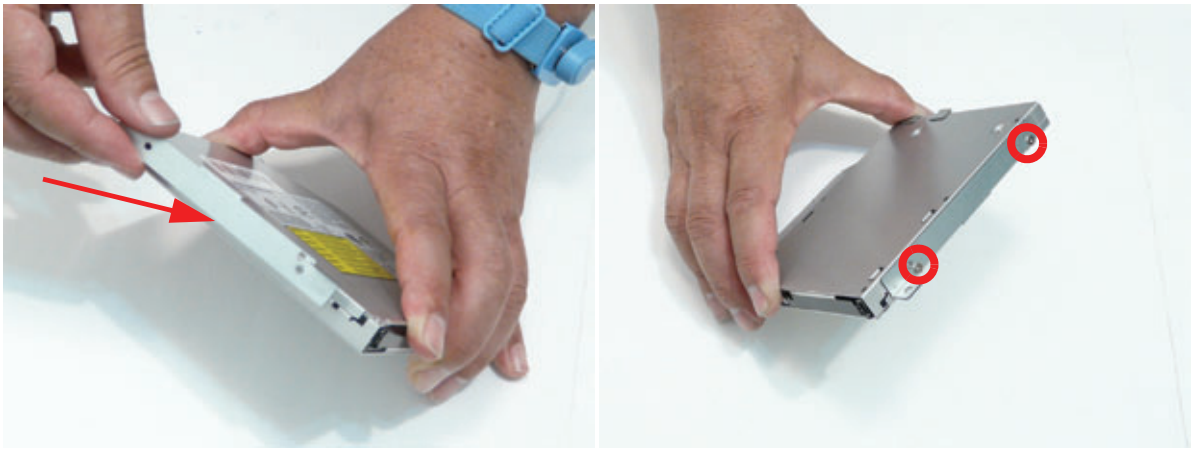
Replacing the ODD Module

1. Replace the rear ODD bracket and replace the two (2) screws.



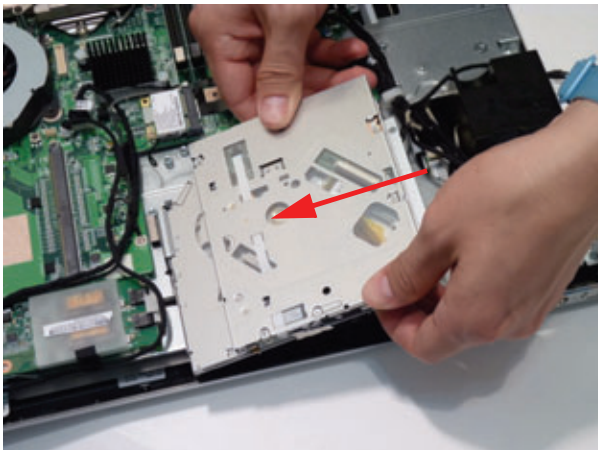
Step	Size	Quantity	Screw Type
ODD Rear Bracket	M2*2.5	2	

2. Replace the side ODD bracket and replace the two (2) screws.

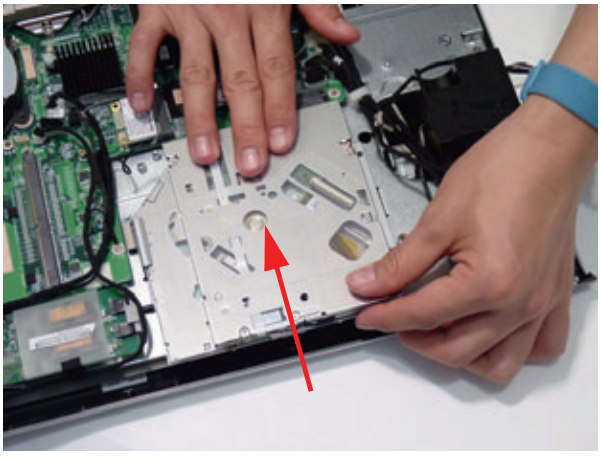


Step	Size	Quantity	Screw Type
ODD Side Bracket	M2*2.5	2	

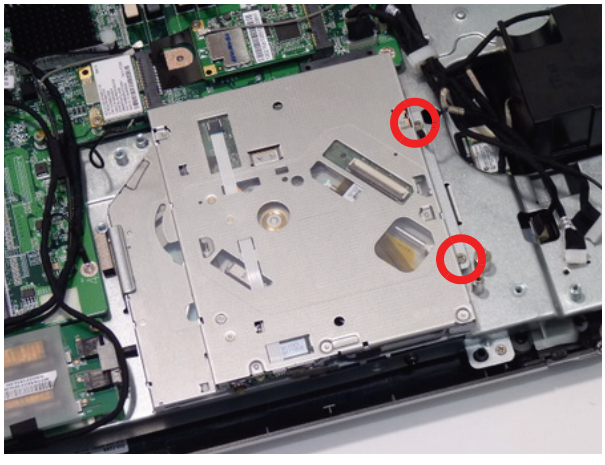
3. Place the ODD onto the chassis.



4. Slide the ODD assembly into place.



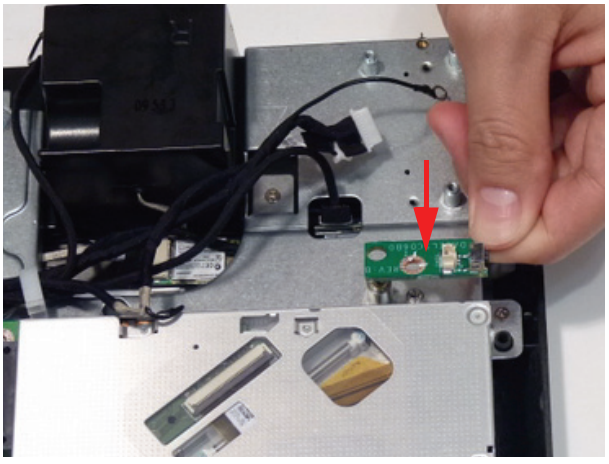
5. Replace the two (2) screws.



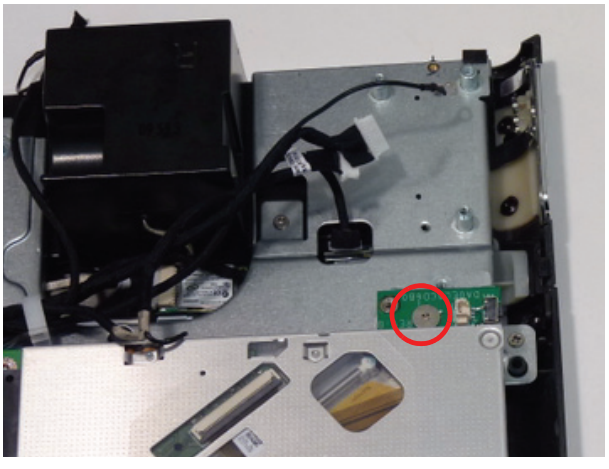
Step	Size	Quantity	Screw Type
ODD	M2.5*4	2	

Replacing the ODD Eject Board

1. Place the ODD Eject Board onto the chassis.

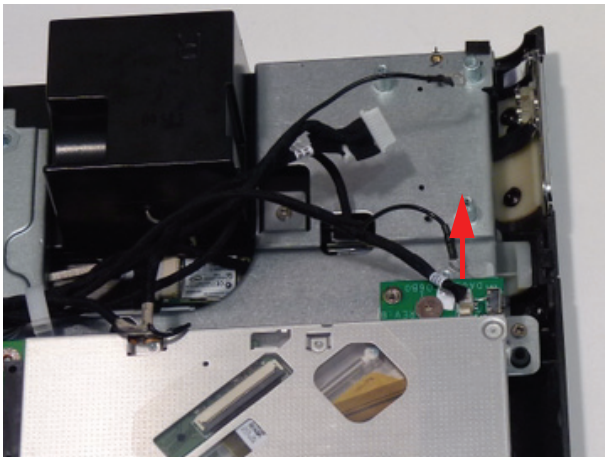


2. Replace the one (1) screw to secure the ODD eject board.



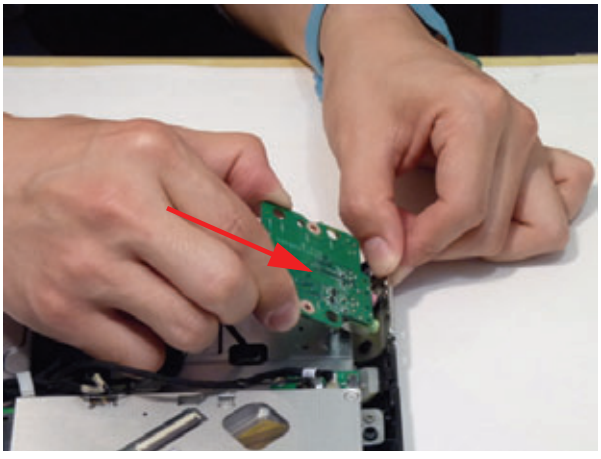
Step	Size	Quantity	Screw Type
Audio Board	M2.5*4	2	

3. Connect the ODD Eject Board Cable.

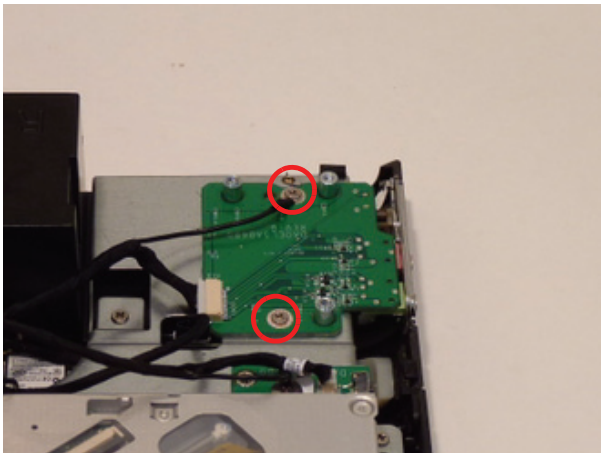


Replacing the Audio Board

1. Place the audio board onto the chassis.

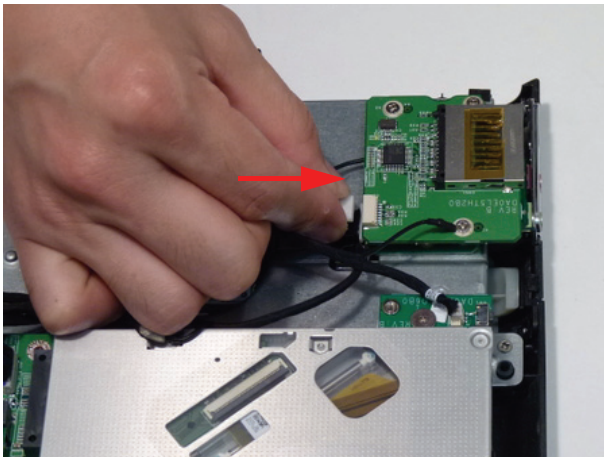


2. Connect the two (2) screws to secure the audio board.



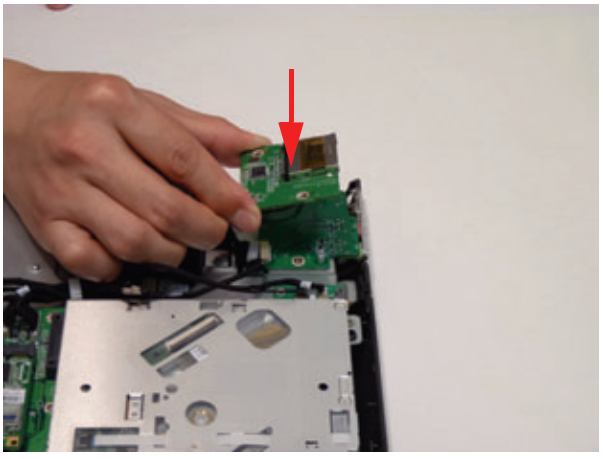
Step	Size	Quantity	Screw Type
Audio Board	M2.5*4	2	

3. Connect the Audio board cable.

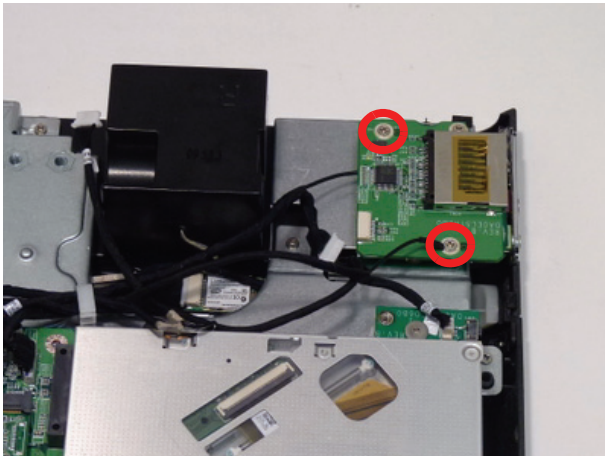


Connect the Card Reader Board

1. Place the card reader board onto the chassis.

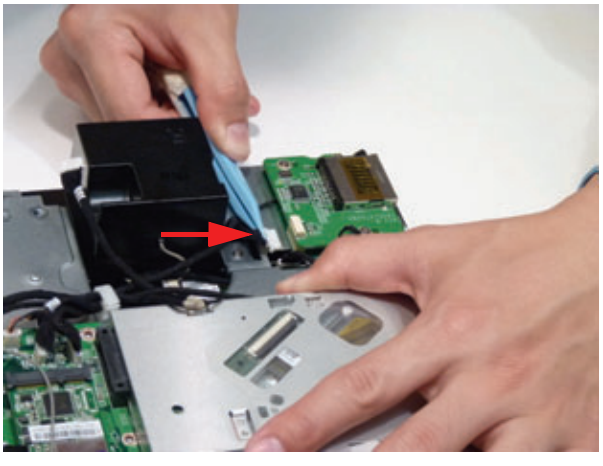


2. Replace the two (2) screws.



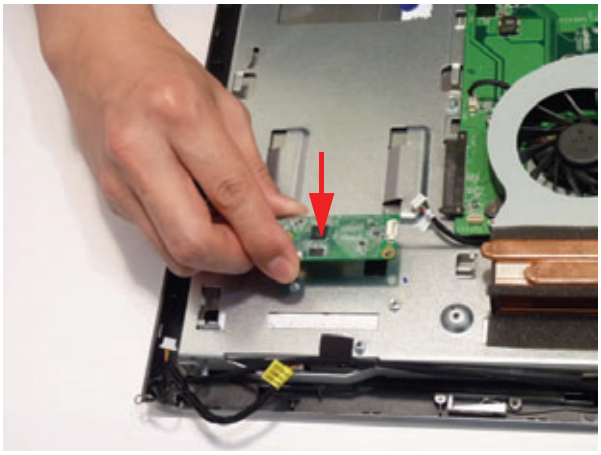
Step	Size	Quantity	Screw Type
Card Reader Board	2.5*4	2	

3. Connect the Card Reader Board cable.

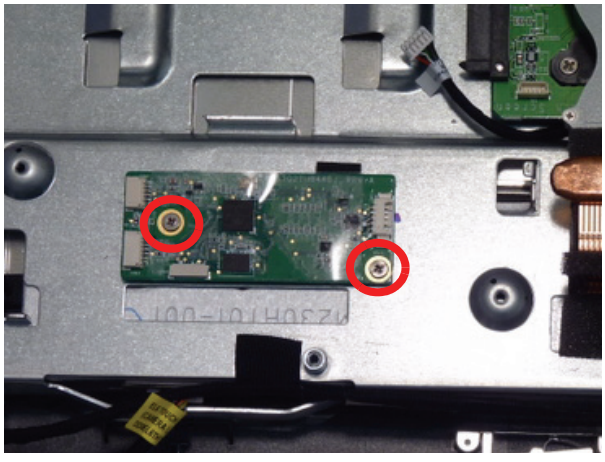


Replacing the Touchscreen Board

1. Place the touchscreen board onto the chassis.



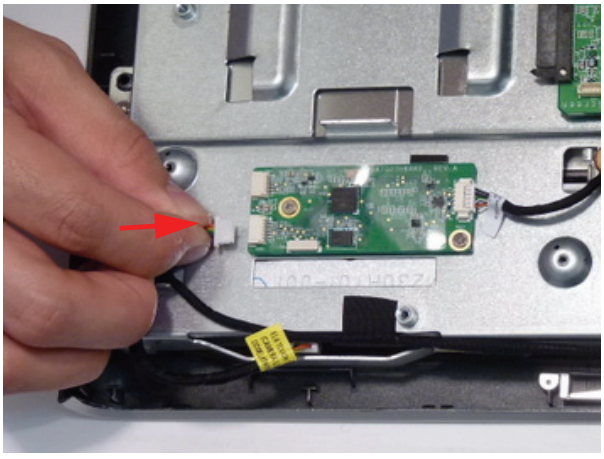
2. Replace the two (2) screws.



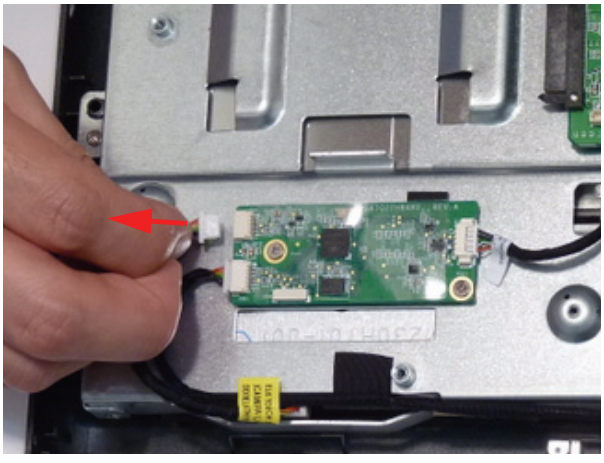
Step	Size	Quantity	Screw Type
Touchscreen Control Board	M2.5*4	1	

3. Connect the touchscreen board to mainboard cable.

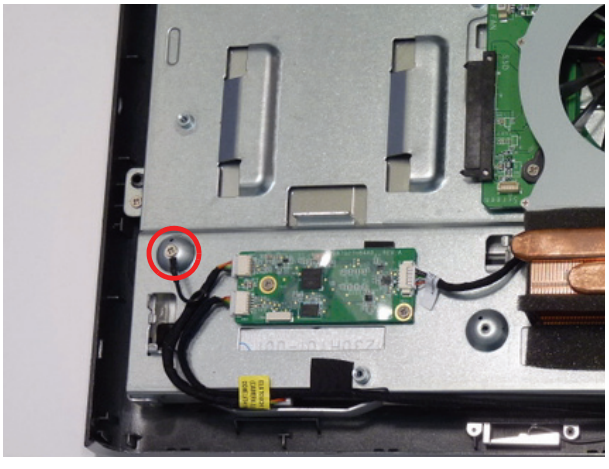
4. Connect the left (bottom) touch sensor cable.



5. Connect the right (top) touch sensor cable.

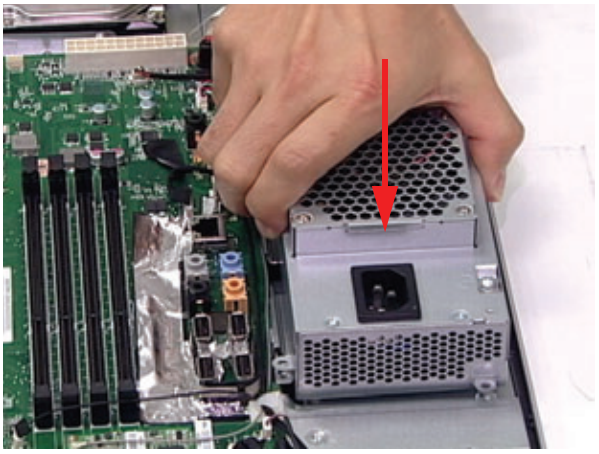


6. Replace the one (1) ground cable screw.

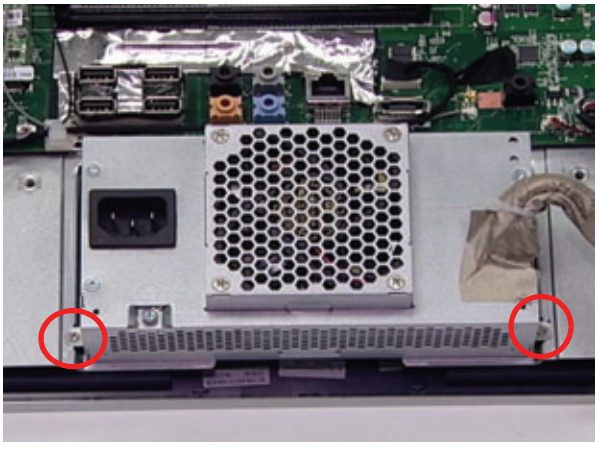


Replacing the Power Supply

1. Place the Power Supply onto the chassis.



2. Replace two (2) screws to secure the Power Supply as shown.

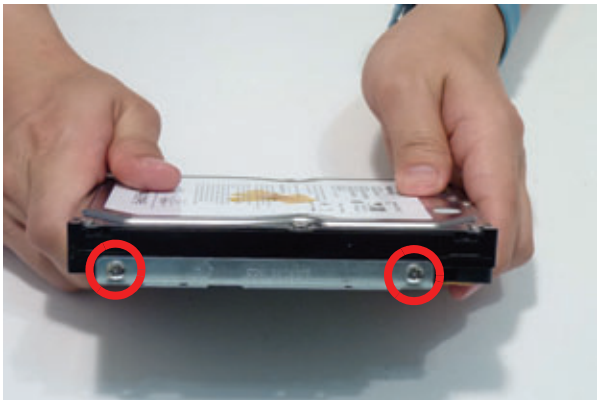


Step	Size	Quantity	Screw Type
Power Supply	M2.5*4	2	

Replacing the HDD

1. Replace the HDD brackets.

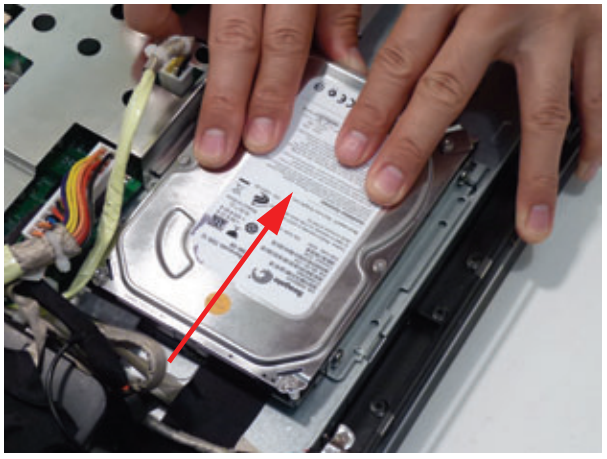
2. Replace the four (4) screws to secure the HDD bracket (both sides).



Step	Size	Quantity	Screw Type
HD Bracket	M3*4	4	

3. Place the HDD on to the chassis.

4. Slide the HDD away from the speakers to secure it.



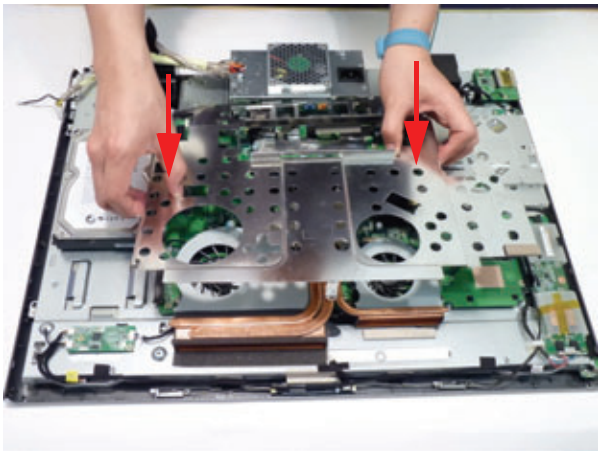
5. Replace the two (2) screws.

Step	Size	Quantity	Screw Type
HDD	M2.5*4	2	

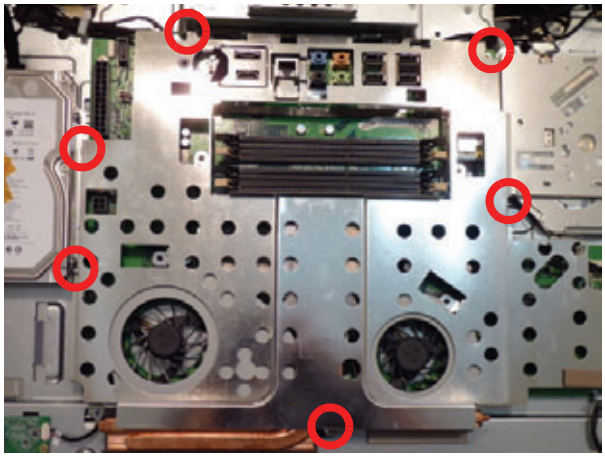
6. Connect the HDD cable.

Replacing the Mainboard Shielding

1. Replace the shield onto the assembly.

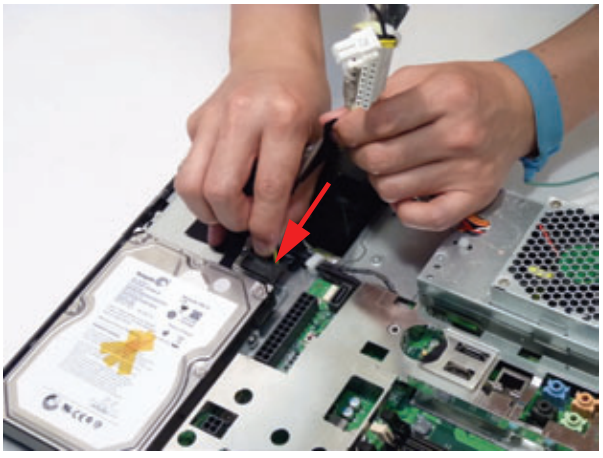


2. Replace the six (6) screws.

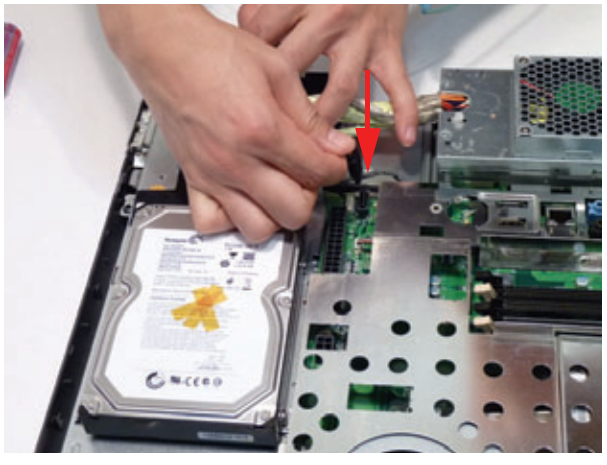


Step	Size	Quantity	Screw Type
Mainboard Shielding	M2.5*4Ni	6	

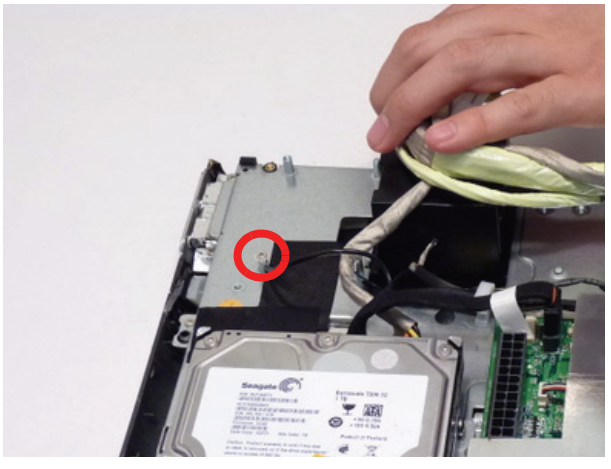
3. Connect the HDD power cable.



4. Connect the HDD cable to the mainboard.

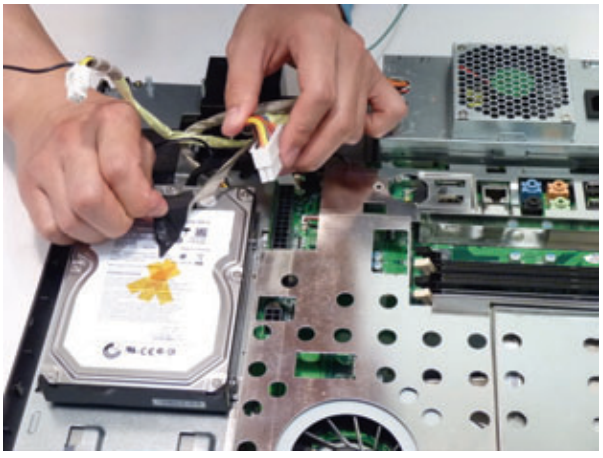


5. Replace the one (1) screw to secure the ground wire.

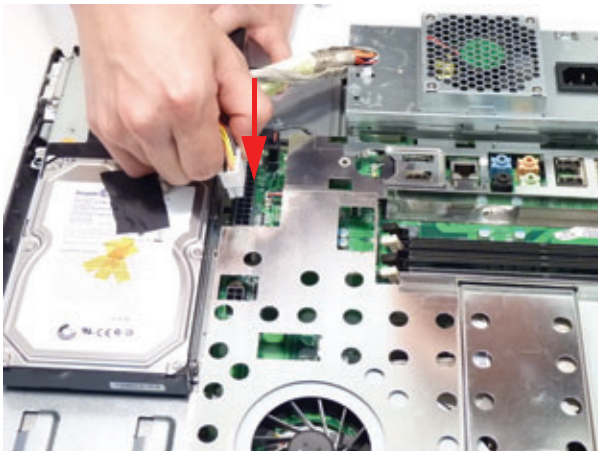


Step	Size	Quantity	Screw Type
Converter Ground Cable	M2.5*4	1	

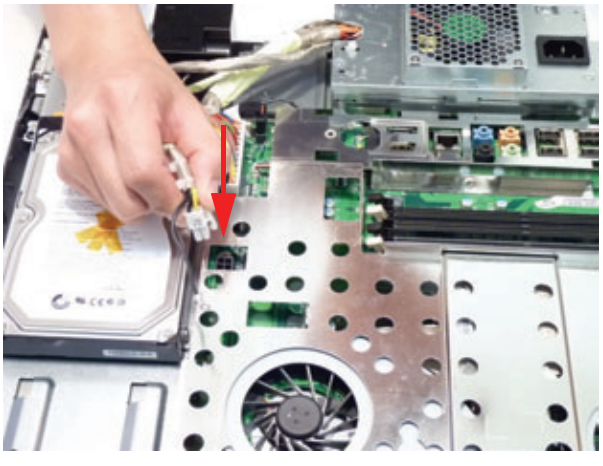
6. Adhere the adhesive tape to secure the HDD ground cable to the HDD.



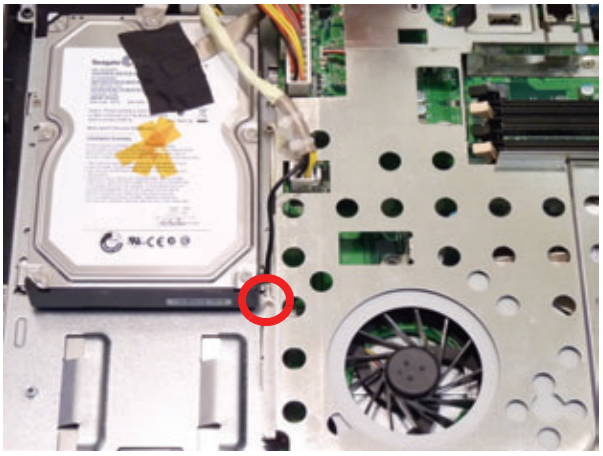
7. Connect the power cable to the mainboard.



8. Connect the TBD wire to the mainboard.



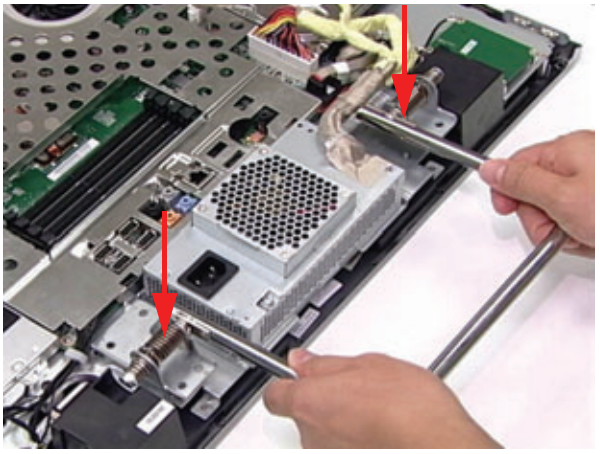
9. Connect the one (1) screw to secure the ground wire.



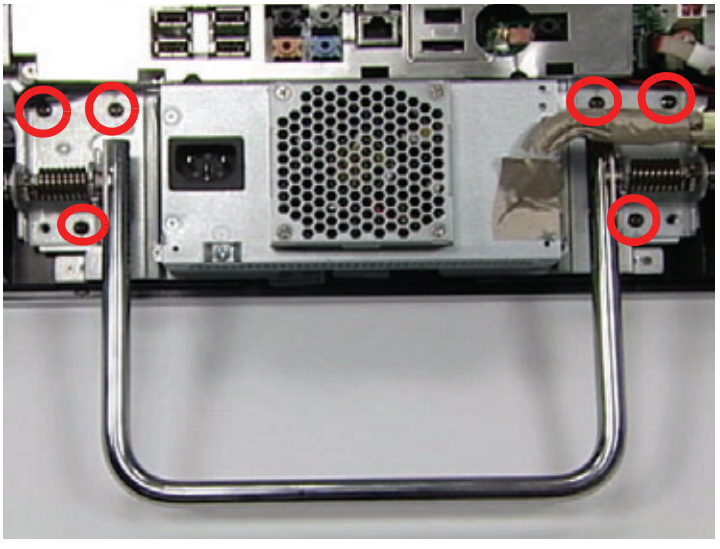
Step	Size	Quantity	Screw Type
HDD Ground Cable	M2.5*4	1	

Replacing the Hinge

1. Place the Hinge onto the chassis.



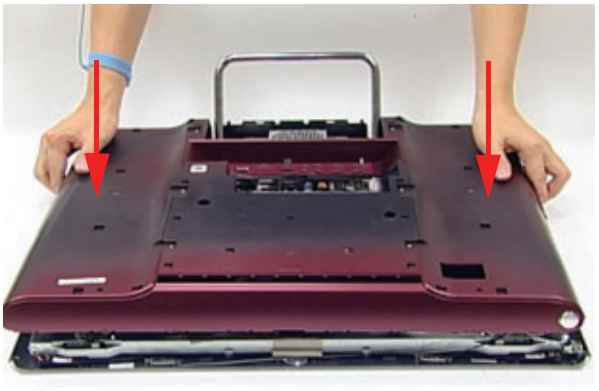
2. Replace the six (6) screws to secure the Hinge.



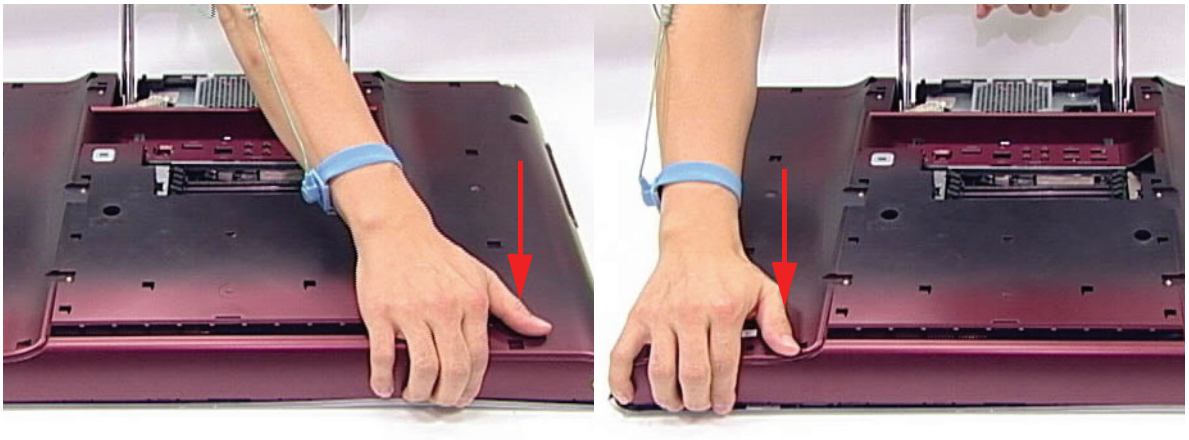
Step	Size	Quantity	Screw Type
Hinge	M4*8	6	

Replacing the Rear Cover

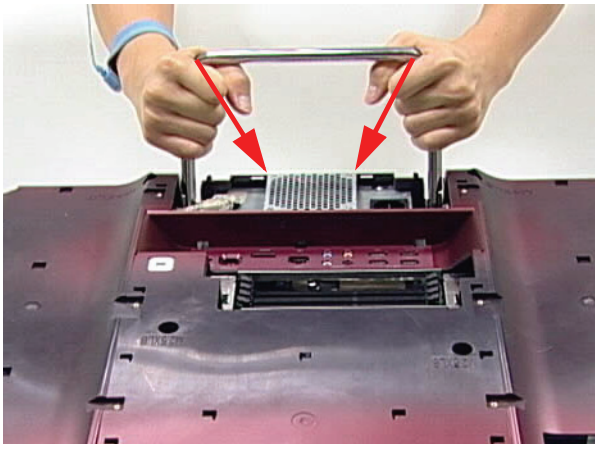
3. Place the Back Cover on to the device.



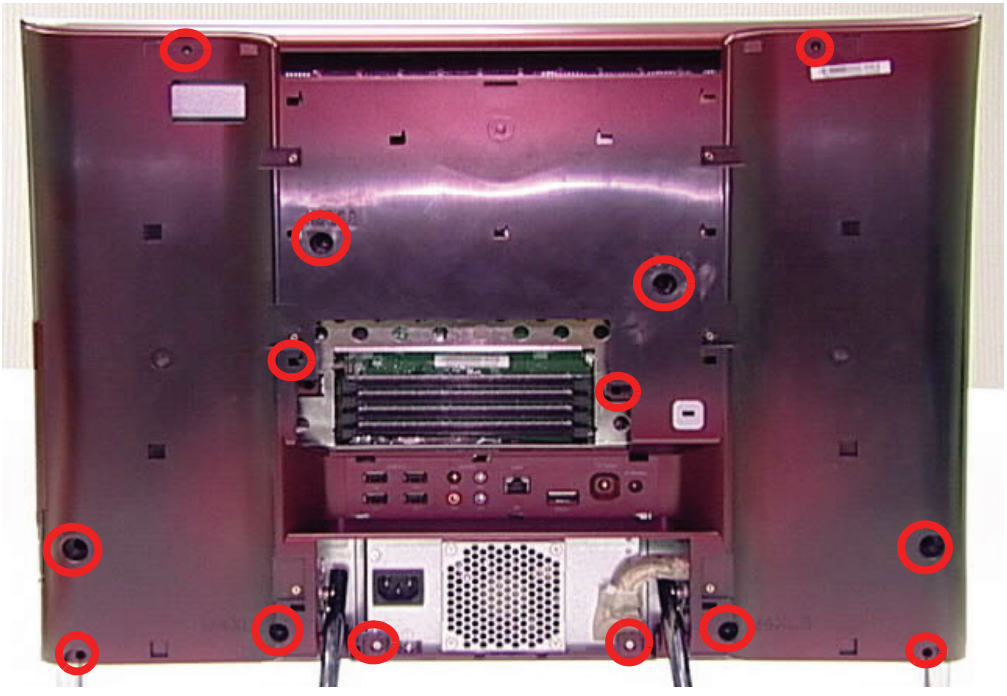
4. Press down firmly to engage the locking clips beneath the cover.



5. Use both hands to move the Hinge to the down position.



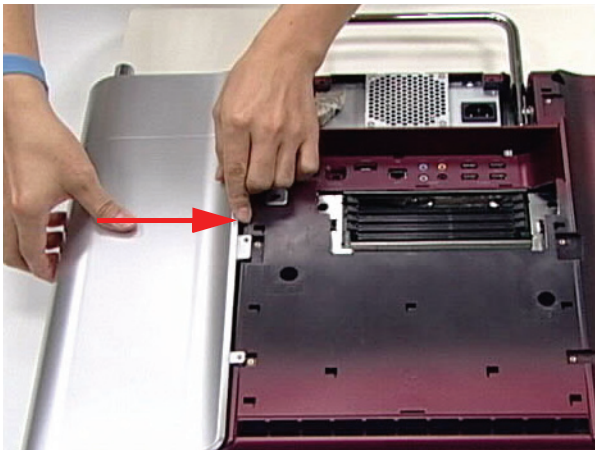
6. Remove the fourteen (14) screws securing the Back Cover.



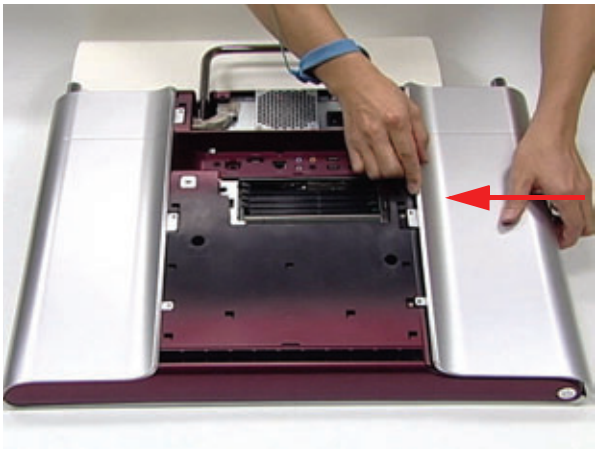
Step	Size	Quantity	Screw Type
Back Cover	2.5*8		
	2.4*8		

Replacing the Rear Covers

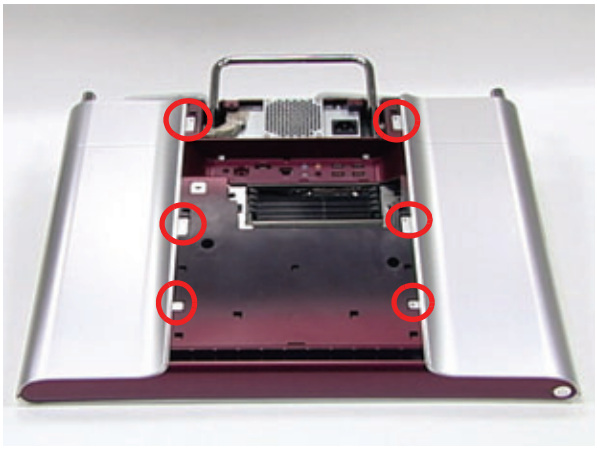
1. Place the first Rear Cover onto the Back Cover and slide it into place.



2. Repeat for the second Rear Cover.



3. Replace the six (6) screws to secure the Rear Covers.



Step	Size	Quantity	Screw Type
Rear Covers	M2.5*6.0	6	

Replacing the RAM

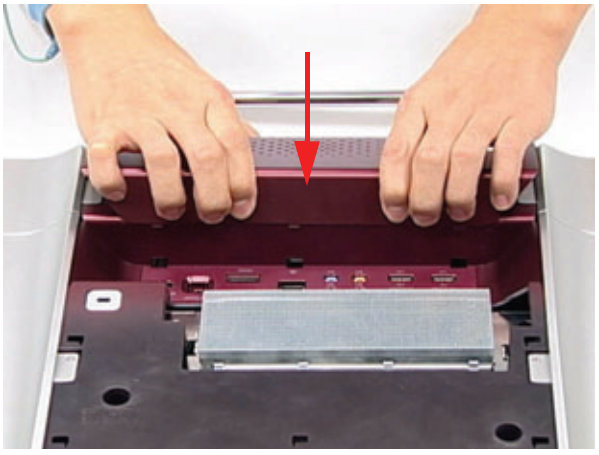
4. Place each RAM module into its slot.

5. Lock the latches on either side of the RAM by pressing inwards as shown.

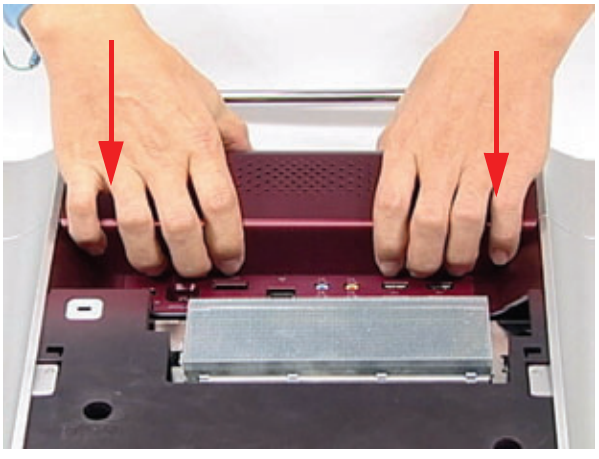
6. Place the RAM Shielding onto the device.

Replacing the Rear Covers

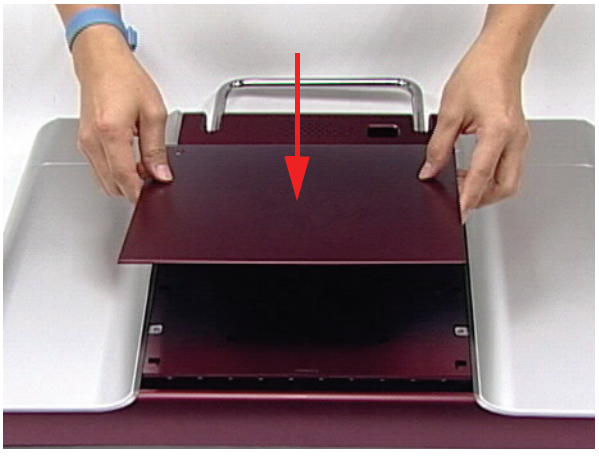
1. Place the Hinge Cover onto the device.



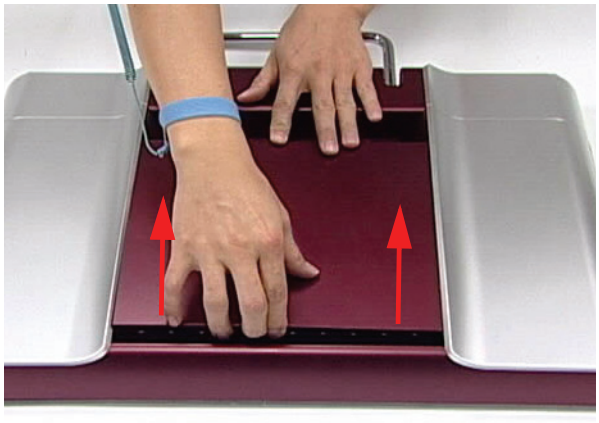
2. Apply pressure to engage the Hinge Cover latches.



3. Place the RAM Cover onto the device.



4. Slide the RAM Cover into place.



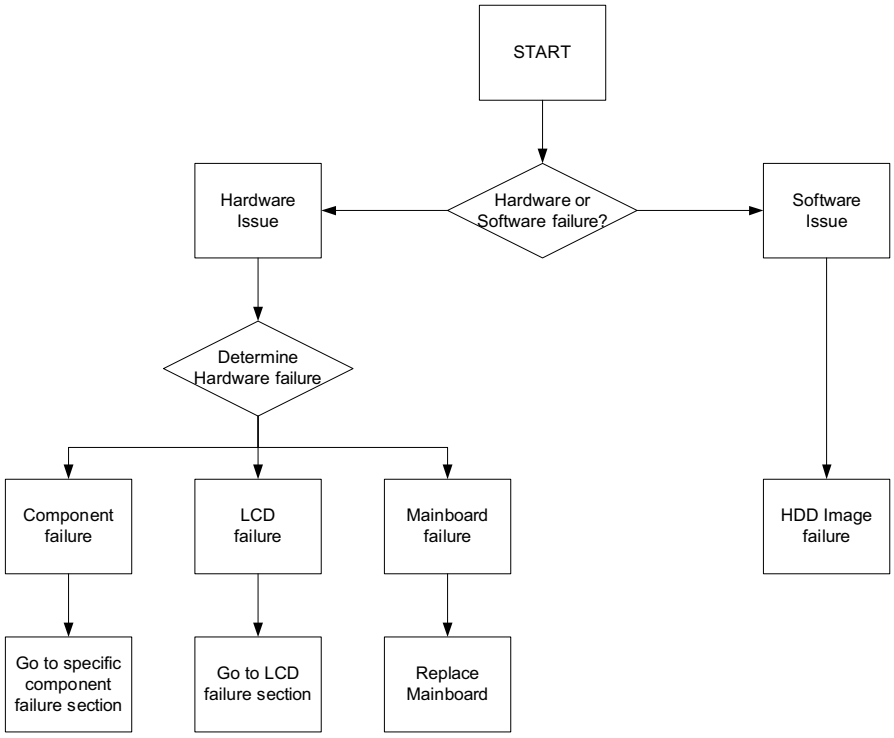
Troubleshooting

Common Problems

Use the following procedure as a guide for computer problems.

NOTE: The diagnostic tests are intended to test only Acer products. Non-Acer products, prototype cards, or modified options can give false errors and invalid system responses.

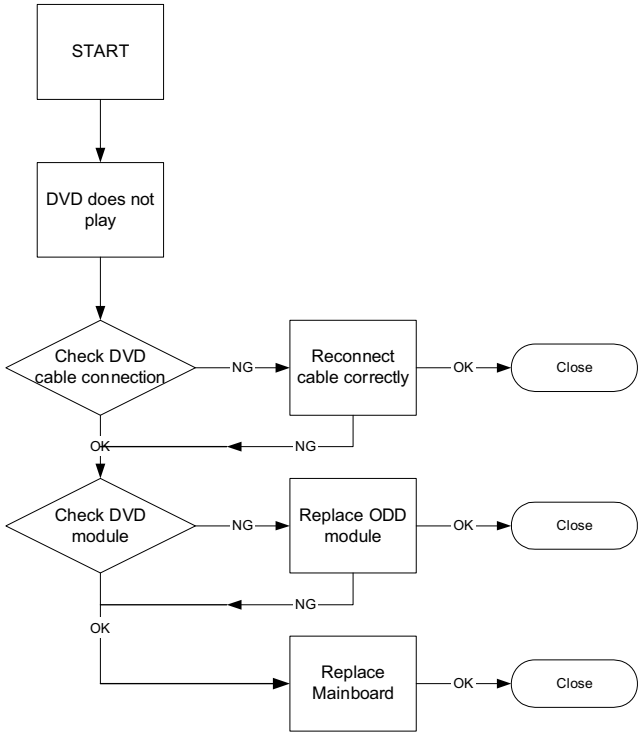
1. Obtain the failing symptoms in as much detail as possible.
2. Verify the symptoms by attempting to re-create the failure by running the diagnostic test or by repeating the same operation.
3. Use the troubleshooting sections to try and resolve the issue.



4. If the Issue is still not resolved, see “Online Support Information” on page 192.

ODD Failure

If an Optical Disk Drive failure is determined, use the following flowchart to determine the required action:



ODD Not Operating Correctly

If the **ODD** exhibits any of the following symptoms it may be faulty:

- Audio CDs do not play when loaded
- DVDs do not play when loaded
- Blank discs do not burn correctly
- DVD or CD play breaks up or jumps
- Optical drive not found or not active:
  - Not shown in My Computer or the BIOS setup
  - LED does not flash when the computer starts up
  - The tray does not eject
- Access failure screen displays
- The ODD is noisy

Perform the following general solutions one at a time to correct the problem.

1. Reboot the computer and retry the operation.
2. Try an alternate disc.
3. Navigate to **Start**→ **Computer**. Check that the ODD device is displayed in the **Devices with Removable Storage** panel.
4. Navigate to **Start**→ **Control Panel**→ **System and Maintenance**→ **System**→ **Device Manager**.
   a. Double-click **IDE ATA/ATAPI controllers**. If a device displays a down arrow, right-click on the device and click **Enable**.

b. Double-click **DVD/CD-ROM drives**. If the device displays a down arrow, right-click on the device and click **Enable**.

c. Check that there are no yellow exclamation marks against the items in **IDE ATA/ATAPI controllers**. If a device has an exclamation mark, right-click on the device and uninstall and reinstall the driver.

d. Check that there are no yellow exclamation marks against the items in **DVD/CD-ROM drives**. If a device has an exclamation mark, right-click on the device and uninstall and reinstall the driver.

e. If the exclamation marker is not removed from the item in the lists, try removing any recently installed software and retrying the operation.

Discs Do Not Play

If discs do not play when inserted in the drive, perform the following actions one at a time to correct the problem.

1. Check that the disc is correctly seated in the drive tray and that the label on the disc is visible.
2. Check that the media is clean and scratch free.
3. Try an alternate disc in the drive.
4. Ensure that **AutoPlay** is enabled:
   a. Navigate to **Start**→ **Control Panel**→ **Hardware and Sound**→ **AutoPlay**.
   b. Select **Use AutoPlay for all media and devices**.
   c. In the Audio CD and DVD Movie fields, select the desired player from the drop down menu.
5. Check that the Regional Code is correct for the selected media:

IMPORTANT: Region can only be changed a limited number of times. After Changes remaining reaches zero, the region cannot be changed even Windows is reinstalled or the drive is moved to another computer.

   a. Navigate to **Start**→ **Control Panel**→ **System and Maintenance**→ **System**→ **Device Manager**.
   b. Double-click **DVD/CD-ROM drives**.
   c. Right-click **DVD drive** and click **Properties**, then click the **DVD Region** tab.
   d. Select the region suitable for the media inserted in the drive.

Discs Do Not Burn Properly

If discs can not be burned, perform the following actions one at a time to correct the problem.

1. Ensure that the default drive is record enabled:
   a. Navigate to **Start**→ **Computer** and right-click the writable ODD icon. Click **Properties**.
   b. Select the **Recording** tab. In the **Desktop disc recording** panel, select the writable ODD from the drop down list.
   c. Click **OK**.
2. Ensure that the software used for burning discs is the factory default. If using different software, refer to the software's user manual.

Playback is Choppy

If playback is choppy or jumps, perform the following actions one at a time to correct the problem.

1. Check that system resources are not running low:
   a. Try closing some applications.
   b. Reboot and try the operation again.
2. Check that the ODD controller transfer mode is set to DMA:
   a. Navigate to **Start**→ **Control Panel**→ **System and Maintenance**→ **System**→ **Device Manager**.
   b. Double-click **IDE ATA/ATAPI controllers**, then right-click ATA Device 0.

c. Click **Properties** and select the **Advanced Settings** tab. Ensure that the **Enable DMA** box is checked and click **OK**.

d. Repeat for the other ATA Devices shown if applicable.

Drive Not Detected

If Windows cannot detect the drive, perform the following actions one at a time to correct the problem.

1. Restart the computer and press F2 to enter the BIOS Utility.
2. Check that the drive is detected in the **ATAPI Model Name** field on the Information page.

   NOTE: Check that the entry is identical to one of the ODDs specified in “Hardware Specifications and Configurations” on page 13.
3. Turn off the power and remove the cover to inspect the connections to the ODD. See “Disassembly Process” on page 42.

   a. Check for broken connectors on the drive, motherboard, and cables.

   b. Check for bent or broken pins on the drive, motherboard, and cable connections.

   c. Try an alternate cable, if available. If the drive works with the new cable, the original cable should be replaced.
4. Reseat the drive ensuring and all cables are connected correctly.
5. Replace the ODD. See “Disassembly Process” on page 42.

Drive Read Failure

If discs cannot be read when inserted in the drive, perform the following actions one at a time to correct the problem.

1. Remove and clean the failed disc.
2. Retry reading the CD or DVD.

   d. Test the drive using other discs.

   e. Play a DVD movie

   f. Listen to a music CD

   If the ODD works properly with alternate discs, the original disc is probably defective and should be replaced.
3. Turn off the power and remove the cover to inspect the connections to the ODD. See “Disassembly Process” on page 42.

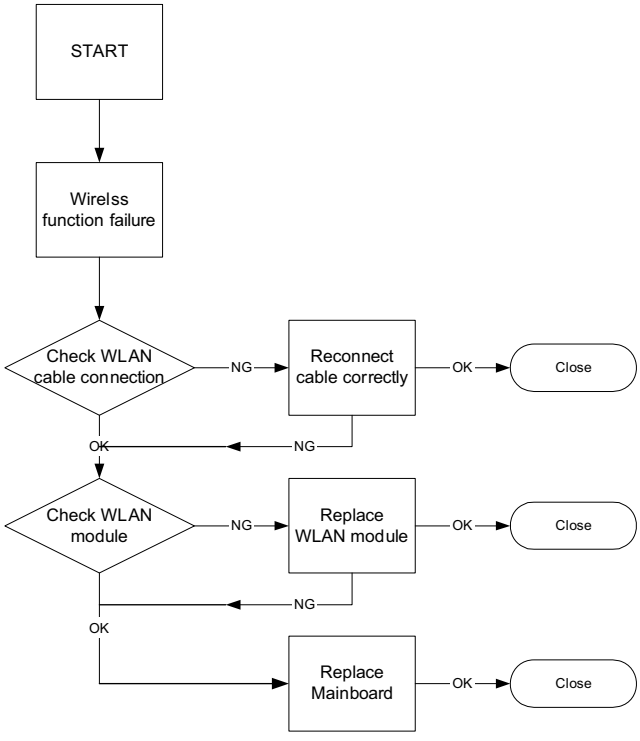
   a. Check for broken connectors on the drive, motherboard, and cables.

   b. Check for bent or broken pins on the drive, motherboard, and cable connections.

   c. Try an alternate cable, if available. If the drive works with the new cable, the original cable should be replaced.
4. Replace the ODD. See “Disassembly Process” on page 42.

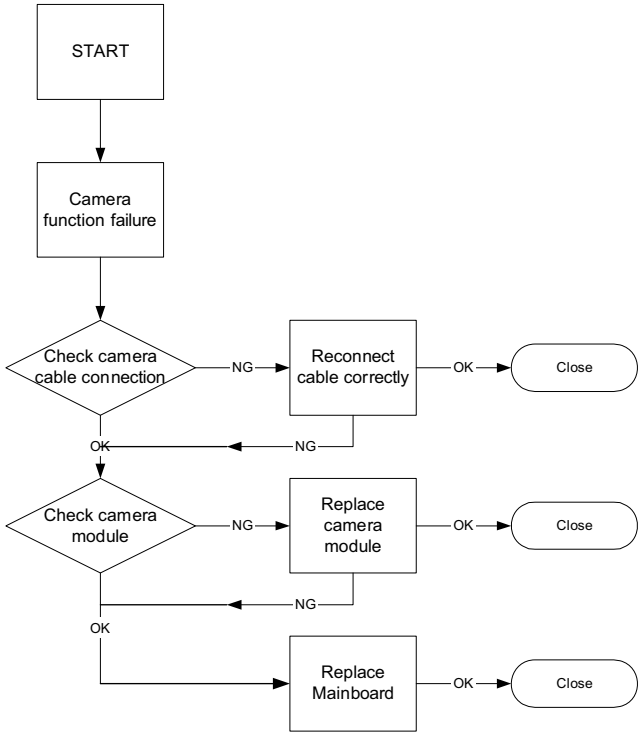
Wireless Failure

If the wireless functionality fails, use the following flowchart to determine the required action:



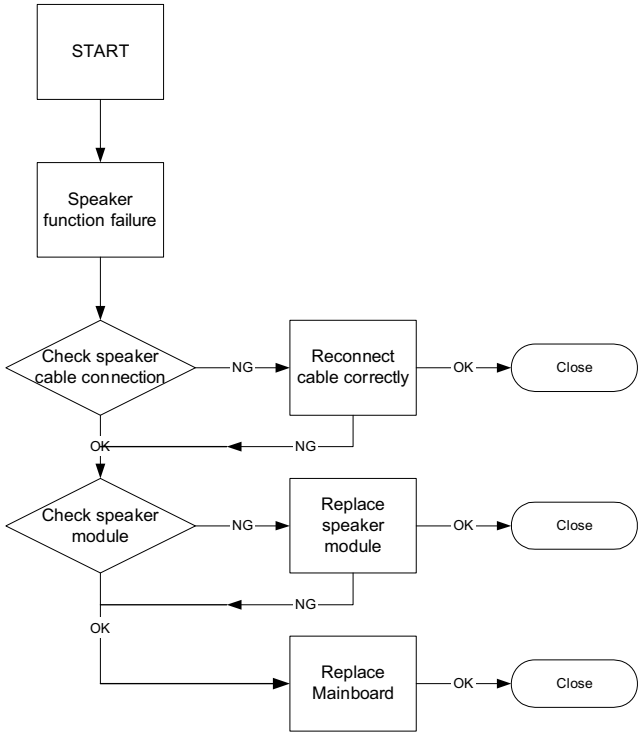
Camera Failure

If the camera functionality fails, use the following flowchart to determine the required action:



Speaker Failure

If the internal speaker fails, use the following flowchart to determine the required action:



Sound Problems

If sound problems are experienced, perform the following actions one at a time to correct the problem.

1. Reboot the computer.
2. Navigate to **Start→ Control Panel→ System and Maintenance→ System→ Device Manager**. Check the Device Manager to determine that:
   - The device is properly installed.
   - There are no red Xs or yellow exclamation marks.
   - There are no device conflicts.
   - No hardware is listed under Other Devices.
3. Roll back the audio driver to the previous version, if updated recently.
4. Remove and reinstall the audio driver.
5. Ensure that all volume controls are set mid range:
   a. Click the volume icon on the taskbar and drag the slider to 50. Ensure that the volume is not muted.
   b. Click Mixer to verify that other audio applications are set to 50 and not muted.
6. Navigate to **Start→ Control Panel→ Hardware and Sound→ Sound**. Ensure that Speakers are selected as the default audio device (green check mark).
   NOTE: If Speakers does not show, right-click on the **Playback** tab and select **Show Disabled Devices** (clear by default).
7. Select Speakers and click **Configure** to start **Speaker Setup**. Follow the onscreen prompts to configure the speakers.
8. Remove and recently installed hardware or software.

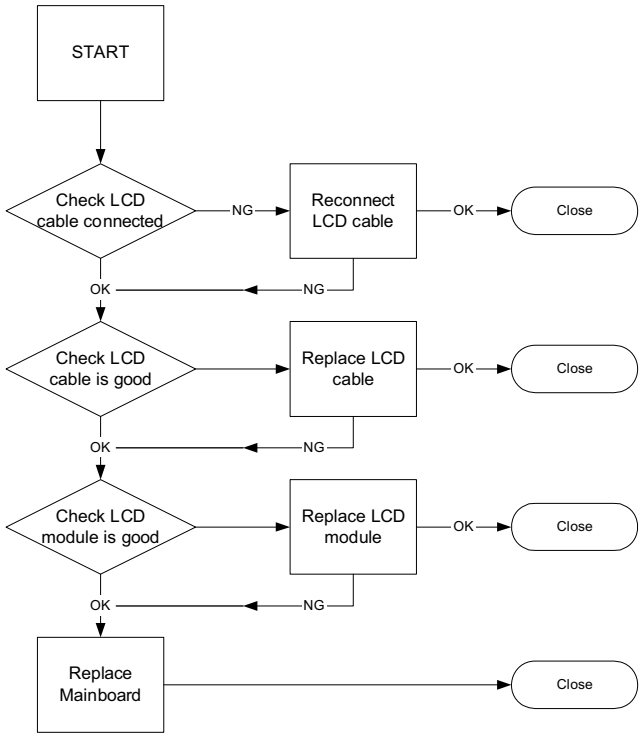
9. Restore system and file settings from a known good date using **System Restore**.

   If the issue is not fixed, repeat the preceding steps and select an earlier time and date.

10. Reinstall the Operating System.
11. If the Issue is still not resolved, see “Online Support Information” on page 192.

LCD Failure

If the integrated LCD display fails, use the following flowchart to determine the required action:



No POST or Video

If the POST or video doesn't display, perform the following actions one at a time to correct the problem.

1. Make sure the computer has power by checking at least one of the following occurs:
   - Fans start up
   - Status LEDs light up
2. Drain any stored power by removing the power cable and battery and holding down the power button for 10 seconds. Reconnect the power and reboot the computer.
3. Disconnect power and all external devices including port replicators or docking stations. Remove any memory cards and CD/DVD discs. Restart the computer.

   If the computer boots correctly, add the devices one by one until the failure point is discovered.
4. Reseat the memory modules.
5. Remove the drives (see "Disassembly Process" on page 42).
6. If the Issue is still not resolved, see "Online Support Information" on page 192.

Abnormal Video Display

If video displays abnormally, perform the following actions one at a time to correct the problem.

1. Reboot the computer.
2. If permanent vertical/horizontal lines or dark spots display in the same location, the LCD is faulty and should be replaced. See “Disassembly Process” on page 42.
3. If extensive pixel damage is present (different colored spots in the same locations on the screen), the LCD is faulty and should be replaced. See “Disassembly Process” on page 42.
4. Adjust the brightness to its highest level. See the User Manual for instructions on adjusting settings.

   NOTE: Ensure that the computer is not running on battery alone as this may reduce display brightness.

   If the display is too dim at the highest brightness setting, the LCD is faulty and should be replaced. See “Disassembly Process” on page 42.
5. Check the display resolution is correctly configured:
   a. Minimize or close all Windows.
   b. If display size is only abnormal in an application, check the view settings and control/mouse wheel zoom feature in the application.
   c. If desktop display resolution is not normal, right-click on the desktop and select **Personalize→ Display Settings**.
   d. Click and drag the Resolution slider to the desired resolution.
   e. Click **Apply** and check the display. Readjust if necessary.
6. Roll back the video driver to the previous version if updated.
7. Remove and reinstall the video driver.
8. Check the Device Manager to determine that:
   - The device is properly installed. There are no red Xs or yellow exclamation marks.
   - There are no device conflicts.
   - No hardware is listed under Other Devices.
9. If the Issue is still not resolved, see “Online Support Information” on page 192.
10. Run the Windows Memory Diagnostic from the operating system DVD and follow the onscreen prompts.
11. If the Issue is still not resolved, see “Online Support Information” on page 192.

General Troubleshooting Issues

Computer Shutsdown Intermittently

If the system powers off at intervals, perform the following actions one at a time to correct the problem.

1. Check the power cable is properly connected to the computer and the electrical outlet.
2. Remove any extension cables between the computer and the outlet.
3. Remove any surge protectors between the computer and the electrical outlet. Plug the computer directly into a known good electrical outlet.
4. Disconnect the power and open the casing to check the Thermal Unit and fan airways are free of obstructions.
5. Remove all external and non-essential hardware connected to the computer that are not necessary to boot the computer to the failure point.
6. Remove any recently installed software.
7. If the Issue is still not resolved, see “Online Support Information” on page 192.

Random Loss of BIOS Settings

If the computer is experiencing intermittent loss of BIOS information, perform the following actions one at a time to correct the problem.

1. If the computer is more than one year old, replace the CMOS battery.
2. Run a complete virus scan using up-to-date software to ensure the computer is virus free.
3. If the computer is experiencing HDD or ODD BIOS information loss, disconnect and reconnect the power and data cables between devices.

   If the BIOS settings are still lost, replace the cables.
4. If HDD information is missing from the BIOS, the drive may be defective and should be replaced.
5. Replace the Motherboard.
6. If the Issue is still not resolved, see “Online Support Information” on page 192.

Microphone Problems

If internal or external **Microphones** do no operate correctly, perform the following actions one at a time to correct the problem.

1. Check that the microphone is enabled. Navigate to **Start**→ **Control Panel**→ **Hardware and Sound**→ **Sound** and select the **Recording** tab.
2. Right-click on the **Recording** tab and select **Show Disabled Devices** (clear by default).
3. The microphone appears on the **Recording** tab.
4. Right-click on the microphone and select **Enable**.
5. Select the microphone then click **Properties**. Select the **Levels** tab.
6. Increase the volume to the maximum setting and click **OK**.
7. Test the microphone hardware:
   a. Select the microphone and click **Configure**.
   b. Select **Set up microphone**.
   c. Select the microphone type from the list and click **Next**.
   d. Follow the onscreen prompts to complete the test.
8. If the Issue is still not resolved, see “Online Support Information” on page 192.

HDD Not Operating Correctly

If the **HDD** does not operate correctly, perform the following actions one at a time to correct the problem.

1. Disconnect all external devices.
2. Run a complete virus scan using up-to-date software to ensure the computer is virus free.
3. Run the Windows 7 Startup Repair Utility:
   a. insert the Windows 7 Operating System DVD in the ODD and restart the computer.
   b. When prompted, press any key to start to the operating system DVD.
   c. The **Install Windows** screen displays. Click **Next**.
   d. Select **Repair your computer**.
   e. The **System Recovery Options** screen displays. Click **Next**.
   f. Select the appropriate operating system, and click **Next**.

   NOTE: Click **Load Drivers** if controller drives are required.

   g. Select **Startup Repair**.
   h. Startup Repair attempts to locate and resolve issues with the computer.
   i. When complete, click **Finish**.

   If an issue is discovered, follow the onscreen information to resolve the problem.
4. Run the Windows Memory Diagnostic Tool. For more information see Windows Help and Support.
5. Restart the computer and press F2 to enter the BIOS Utility. Check the BIOS settings are correct and that CD/DVD drive is set as the first boot device on the Boot menu.
6. Ensure all cables and jumpers on the HDD and ODD are set correctly.
7. Remove any recently added hardware and associated software.
8. Run the Windows Disk Defragmenter. For more information see Windows Help and Support.
9. Run Windows Check Disk by entering **chkdsk /r** from a command prompt. For more information see Windows Help and Support.
10. Restore system and file settings from a known good date using **System Restore**.

    If the issue is not fixed, repeat the preceding steps and select an earlier time and date.
11. Replace the HDD. See “Disassembly Process” on page 42.

External Mouse Failure

If an external **Mouse** fails, perform the following actions one at a time to correct the problem.

1. Try an alternative mouse.
2. If the mouse uses a wireless connection, insert new batteries and confirm there is a good connection. See the mouse user manual.
3. If the mouse uses a USB connection, try an alternate USB port.
4. Try an alternative program to verify mouse operation. Reinstall the program experiencing mouse failure.
5. Restart the computer.
6. Remove any recently added hardware and associated software.
7. Remove any recently added software and reboot.
8. Restore system and file settings from a known good date using **System Restore**.

   If the issue is not fixed, repeat the preceding steps and select an earlier time and date.
9. Run the Event Viewer to check the events log for errors. For more information see Windows Help and Support.
10. Roll back the mouse driver to the previous version if updated recently.

11. Remove and reinstall the mouse driver.
12. Check the Device Manager to determine that:
    - The device is properly installed. There are no red Xs or yellow exclamation marks.
    - There are no device conflicts.
    - No hardware is listed under Other Devices.
13. If the Issue is still not resolved, see “Online Support Information” on page 192.

Intermittent Problems

Intermittent system hang problems can be caused by a variety of reasons that have nothing to do with a hardware defect, such as: cosmic radiation, electrostatic discharge, or software errors. FRU replacement should be considered only when a recurring problem exists.

When analyzing an intermittent problem, do the following:

1. Run the advanced diagnostic test for the system board in loop mode at least 10 times.
2. If no error is detected, do not replace any FRU.
3. If any error is detected, replace the FRU. Rerun the test to verify that there are no more errors.

Undetermined Problems

The diagnostic problems does not identify which adapter or device failed, which installed devices are incorrect, whether a short circuit is suspected, or whether the system is inoperative.

Follow these procedures to isolate the failing FRU (do not isolate non-defective FRU).

NOTE: Verify that all attached devices are supported by the computer.

NOTE: Verify that the power supply being used at the time of the failure is operating correctly.

1. Power-off the computer.
2. Visually check for damage. If any problems are found, replace the FRU.
3. Remove or disconnect all of the following devices:
    - Non-Acer devices
    - Printer, mouse, and other external devices
    - Hard disk drive
    - DIMM
    - CD-ROM/Diskette drive Module
4. Power-on the computer.
5. Determine if the problem has changed.
6. If the problem does not recur, reconnect the removed devices one at a time until you find the failing FRU.
7. If the Issue is still not resolved, see “Online Support Information” on page 192.

POST Codes

These tables describe the POST codes and descriptions during the POST.

Bootblock Initialization Code Checkpoints

Checkpoint	Description
Before D0	If boot block debugger is enabled, CPU cache-as-RAM functionality is enabled at this point. Stack will be enabled from this point.
D0	Early Boot Strap Processor (BSP) initialization like microcode update, frequency and other CPU critical initialization. Early chipset initialization is done.
D1	Early super I/O initialization is done including RTC and keyboard controller. Serial port is enabled at this point if needed for debugging. NMI is disabled. Perform keyboard controller BAT test. Save power-on CPUID value in scratch CMOS. Go to flat mode with 4GB limit and GA20 enabled.
D2	Verify the boot block checksum. System will hang here if checksum is bad.
D3	Disable CACHE before memory detection. Execute full memory sizing module. If memory sizing module not executed, start memory refresh and do memory sizing in Boot block code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM. Copies compressed boot block code to memory in right segments. Copies BIOS from ROM to RAM for faster access. Performs main BIOS checksum and updates recovery status accordingly.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If BIOS recovery is necessary, control flows to checkpoint E0. See Bootblock Recovery Code Checkpoints section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See POST Code Checkpoints section of document for more information.
DC	System is waking from ACPI S3 state
E1-E8EC-EE	OEM memory detection/configuration error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.

Bootblock Recovery Code Checkpoints

Checkpoint	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

POST Code Checkpoints

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A.Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt.Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
07	Fixes CPU POST interface calling pointer.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache - Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit

Checkpoint	Description
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables.Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
20	Relocate System Management Interrupt vector for all CPU in the system.
24	Uncompress and initialize any platform specific BIOS modules. GPNV is initialized at this checkpoint.
2A	Initializes different devices through DIM.See DIM Code Checkpoints section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information. USB controllers are initialized at this point.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested. Check boot password if installed.
8C	Late POST initialization of chipset registers.
8D	Build ACPI tables (if ACPI is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Initialization of system management interrupt by invoking all handlers. Please note this checkpoint comes right after checkpoint 20h
A1	Clean-up work needed before booting to OS.

Checkpoint	Description
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module. Display boot option popup menu.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector.
AB	Prepare BBS for Int 19 boot. Init MP tables.
AC	End of POST initialization of chipset registers. De-initializes the ADM module.
B1	Save system context for ACPI. Prepare CPU for OS boot including final MTRR values.
00	Passes control to OS Loader (typically INT19h).

DIM Code Checkpoints

Checkpoint	Description
2A	Initialize different buses and perform the following functions: Reset, Detect, and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices, and PnP ISA cards. It also assigns PCI bus numbers. Function 1 initializes all static devices that include manual configured onboard peripherals, memory and I/O decode windows in PCI-PCI bridges, and noncompliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI, or AGP video devices.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all onboard peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.

ACPI Runtime Checkpoints

Checkpoint	Description
AC	First ASL check point. Indicates the system is running in ACPI mode.
AA	System is running in APIC mode.
01, 02, 03, 04, 05	Entering sleep state S1, S2, S3, S4, or S5.
10, 20, 30, 40, 50	Waking from sleep state S1, S2, S3, S4, or S5.

Boot Block Beep Codes

Number of Beeps	Description
1	No media present. (Insert diskette in floppy drive A:)
2	'AMIBOOT.ROM' file not found in root directory of diskette in A:
3	Insert next diskette if multiple diskettes are used for recovery
4	Flash Programming successful
5	File read error
7	No Flash EPROM detected
10	Flash Erase error
11	Flash Program error
12	'AMIBOOT.ROM' file size error
13	BIOS ROM image mismatch (file layout does not match image present in flash device)

POST BIOS Beep Codes

Number of Beeps	Description
1	Memory refresh timer error.
3	Base memory read/write test error
6	Keyboard controller BAT command failed
7	General exception error (processor exception interrupt error)

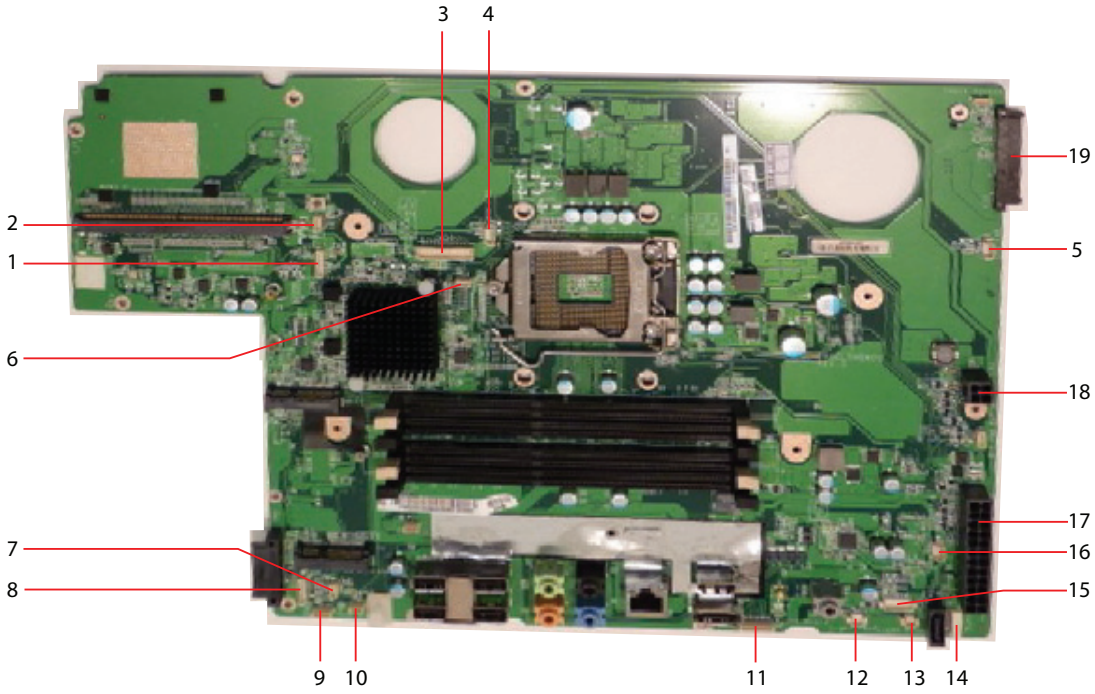
Number of Beeps	Description
8	Display memory error (system video adapter)

Troubleshooting POST BIOS Beep Codes

Number of Beeps	Troubleshooting Action
1, 3	Reseat the memory, or replace with known good modules.
6, 7	Fatal error indicating a serious problem with the system. Consult your system manufacturer. Before declaring the motherboard beyond all hope, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards except the video adapter. • If beep codes are generated when all other expansion cards are absent, consult your system manufacturer's technical support. • If beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This will reveal the malfunctioning card.
8	If the system video adapter is an add-in card, replace or reseat the video adapter. If the video adapter is an integrated part of the system board, the board may be faulty.

Jumper and Connector Locations

Mainboard Top View



Item	Description	Item	Description
1	Iinverter conn	11	Audio conn
2	power conn	12	light foot conn
3	LCD conn	13	light pipe conn
4	GPU FAN conn	14	B-CAS conn
5	CPU FAN conn	15	USB conn
6	camera conn	16	Speaker conn
7	card reader conn	17	PSU SYS
8	Bluetooth conn	18	PSU CPU
9	Home button conn	19	SSD conn
10	IR conn		

BIOS Recovery

1. Please save the SUPER.ROM to a USB key (Root Folder).

NOTE: The USB flash should be a FAT 32 format. It does not need to be a bootable device.

2. Connect the USB key to a USB port in the system.
3. Press the power button to power the system up.
4. Press and hold Ctrl+Home.
5. Continue to press and hold Ctrl+Home until the USB device LED comes on. After the LED comes on, release Ctrl+Home.
6. The system implements the upgrade and reboots automatically. Upon reboot, ensure the BIOS has recovered.

FRU (Field Replaceable Unit) List

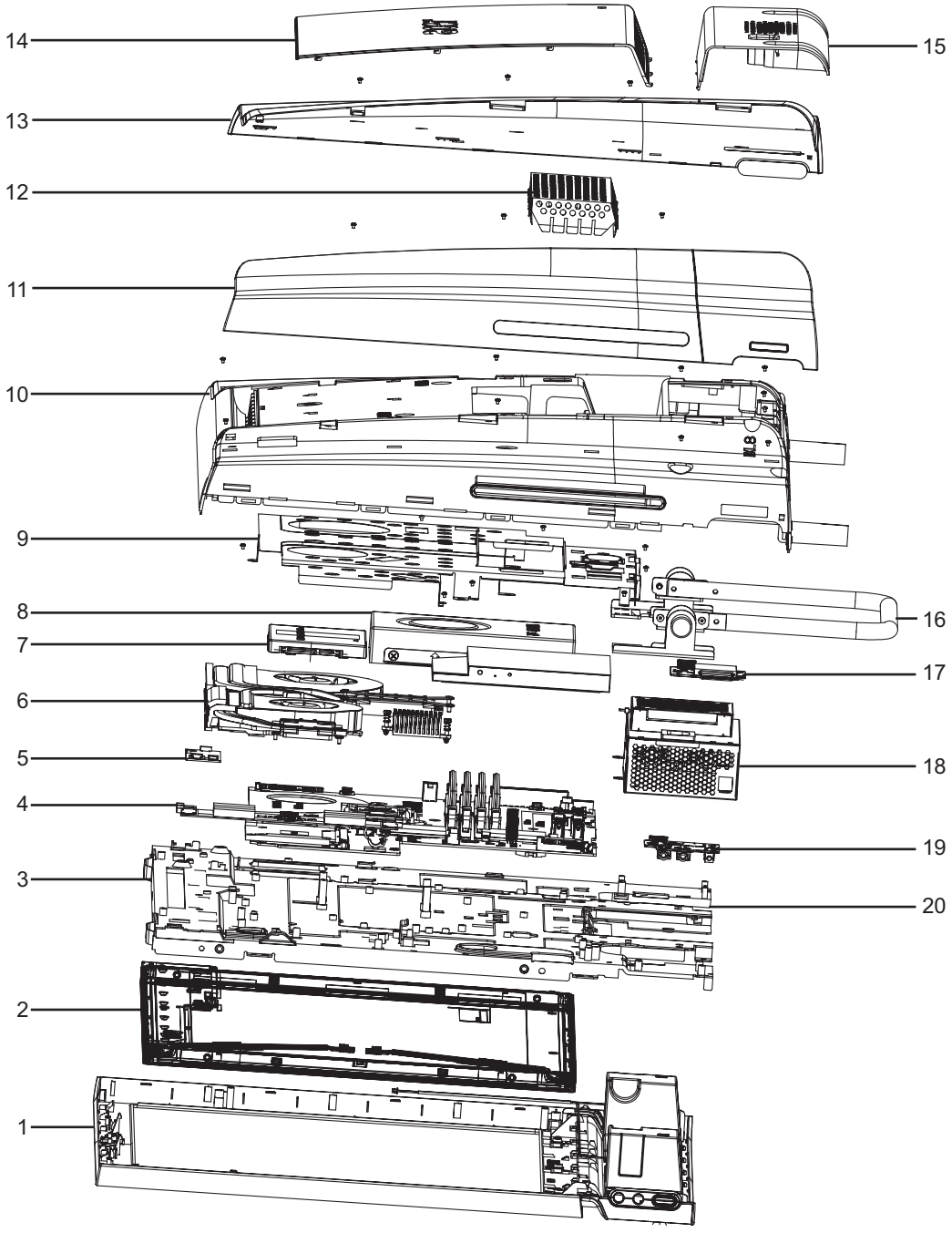
This chapter gives you the FRU (Field Replaceable Unit) listing in global configurations of this computer. Refer to this chapter whenever ordering for parts to repair or for RMA (Return Merchandise Authorization).

Please note that WHEN ORDERING FRU PARTS, you should check the most up-to-date information available on your regional web or channel. For whatever reasons a part number change is made, it will not be noted on the printed Service Guide. For ACER AUTHORIZED SERVICE PROVIDERS, your Acer office may have a DIFFERENT part number code from those given in the FRU list of this printed Service Guide. You MUST use the local FRU list provided by your regional Acer office to order FRU parts for repair and service of customer machines.

To scrap or to return the defective parts, you should follow the local government ordinance or regulations on how to dispose it properly, or follow the rules set by your regional Acer office on how to return it.

Exploded Diagrams

Main Assembly



No.	Description	Acer P/N
1	EL5 FRONT BEZEL ZUB ASSY SILVER	34EL5FBTN00
2	LCD(TFT)23” LTM230H01-A03	AA0230HT002
3	EL5LCD FRAME SUB ASSY	3SEL5LSTN00
4	EL5 MB (LYN)DIS W/O CPU	31EL5MB0020

No.	Description	Acer P/N
5	TQ2G_3.3 CAMB_ARMB W/23” NBA230G3 ASSY	21HYECA00Q0
6	EL5 CPU ASSY (INT,LYNNFIELD 2.66) STN BSQ	23EL5CATN00
7	SS(64G) MMCRE645MPP-OVA STN BSQ	ABSE64G5004
8	HDD (1TB) HDT721010SLA360 0A37993 STNBSQ	AB721010011
9	EL5 BACK FRAME SUB ASSY	3YEL5BATN00
10	EL5 BACK COVER SUB ASSY RED	3Q3L5BCTN00
11	REAR COVER LEFT EL8(EBEL8001,REV3A) SILVER	EBEL8001010
12	FRAME RAM COVER EL8 (FBEL8001,REV3A)	FBEL8001010
13	REAR COVER RIGHT EL8(EBEL8002,REV3A) SILVER	EBEL8002010
14	EL8 RAM COVER SUB ASSY RED	3REL8RCTN00
15	HINGE COVER EU EL8 (EBL8022,REV3A) RED	EBEL8022010
16	HINGE(JAR) EL8 (FAEL8003,REV3A)	FBEL8008010
17	EL5 CARD READER BOARD ASSY	ENEL5CB0000
18	POWER SUPPLY 100.240V 250W DPS-250AB-53A	AF250C00001
19	EL5 AUDIO BOARD ASSY	32EL5AB0000
20	DVD R/R W/RAM 30656280 AD7643S-AR STN B	AW07643S000

IMPORTANT: *The touchscreen control board and LCD panel must be returned together for RMA purposes. See “Removing the Touchscreen Control Board” on page 59. The touchscreen control board records the specific panel’s data, please do not separate these for RMA.

FRU List

CATEGORY	ACER DESCRIPTION	ACER PART NO.
ADD ON CARD		
	288-1N135-000AC GEFORCE G210M 512MB (64BITS) DDR3 SAMSUNG MXM3	VG.PCMG2.100
	288-1N136-000AC GEFORCE GT240M 1GB (128BITS) DDR3 SAMSUNG MXM3	VG.PCMG2.400
BOARD		
	AUDIO BOARD	55.SDB07.001
	CARD READER BOARD	55.SDB07.002
	POWER BOARD	55.SDB07.003
	ODD BOARD	55.SDB07.004
	B CAS BOARD	55.SCY07.005
	INVERTER BOARD DA-4A12-QT03L	19.SCY07.001
	INVERTER BOARD IV40157/T-LF	19.SCY07.002
	Lite-On WN6602RH, Ralink RT3090 WLAN Lite-On WN6602RH, Ralink RT3090, 802.11b/g/n 1x1 WLAN (mini-car	NI.10200.034
	QMI QBT400UB Bluetooth Qcom Technology Inc., Broadcom BCM2046, Bluetooth2.1 + EDR, USB interface module	BT.14500.001
	CAMERA FO20FF-232H 2.0M	57.SDB07.001
	CAMERA CNF925021004170LH 2.0M	57.SDB07.002
	AverMedia A336-D Mini-Card WW Analog + DVB-T Digital	TU.10500.052
	AverMedia A336-A Mini-Card WW Analog + ATSC Digital	TU.10500.051
	AverMedia A325 Mini-Card ISDB-T/BS/CS w/o B-CAS card reader	TU.10500.055

CATEGORY	ACER DESCRIPTION	ACER PART NO.
POWER CORD		
	POWER CORD 1.8M BLACK UK 3P	27.SC907.001
	POWER CORD 1.8M BLACK SWISS 3P	27.SC907.002
	POWER CORD 1.8M BLACK S.A 3P	27.SC907.003
	POWER CORD 1.8M BLACK UK 3P	27.SC907.004
	POWER CORD 1.8M BLACK IT 3P	27.SC907.005
	POWER CORD 1.8M BLACK INDIA 3P	27.SC907.006
	POWER CORD 1.8M BLACK DANISH 3P	27.SC907.007
	POWER CORD 1.8M BLACK AUS 3P	27.SC907.008
	POWER CORD 1.8M BLACK ARGENTINE 3P	27.SC907.009
	POWER CORD 1.8M BLACK US BSMI 3P	27.SC907.010
	POWER CORD 1.8M BLACK JP 2P	27.SC907.011
	POWER CORD 1.8M BLACK US 3P	27.SC907.012
	POWER CORD 1.8M BLACK CHINA 3P	27.SC907.013
	POWER CORD 1.8M BLACK EU 3P	27.SCY07.001
CABLE		
	CABLE - AUDIO/B TO MB	50.SDB07.001
	LVDS CABLE	50.SDB07.002
 	HDD CABLE	50.SCY07.003
	ODD CABLE	50.SDB07.003
	CABLE - CONTROL BORAD TO SENSOR/R	50.SDB07.004
	CABLE - CONTROL BORAD TO SENSOR/L	50.SDB07.005
	CABLE - MB TO CONTROL BOARD	50.SDB07.006
	IR CABLE	50.SDB07.007

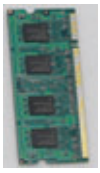
CATEGORY	ACER DESCRIPTION	ACER PART NO.
	INVERTER CABLE	50.SDB07.008
	LED CABLE	50.SCY07.009
	USB CABLE W/PORT	50.SCY07.010
	POWER CABLE	50.SCY07.011
	CARD READER CABLE	50.SDB07.009
	HOME BUTTON CABLE	50.SCY07.016
	BLUETOOTH CABLE	50.SCY07.013
	TV TUNER CABLE	50.SCY07.014
	TV EXTERNAL ANTENNA - DVB-T	50.SCY07.017
	TV EXTERNAL ANTENNA - ATSC	50.G8507.011
	ANTENNA	50.SCY07.018
CASE/COVER/BRACKET ASSEMBLY		
	FRONT COVER ASSY SILVER W/SPEAKER,H/BUTTON B,ANTENNA,USB PORT	60.SDB07.001
	BACK COVER RED HDMI W/TV, IR, IR BLASKER, W/O B CAS	60.SDB07.002
	BACK COVER RED HDMI W/O TV, W/O B CAS	60.SDB07.003
	BACK COVER RED HDMI W/TV, W/ B CAS	60.SDB07.004
	BACK COVER RED HDMI W/O TV, W/ B CAS	60.SDB07.005
	RAM COVER - RED	42.SCY07.001

CATEGORY	ACER DESCRIPTION	ACER PART NO.
	HINGE COVER	42.SCY07.002
	REAR COVER SILVER - LEFT W/O B-CAS	60.SCY07.004
	REAR COVER SILVER - LEFT W/B CAS	60.SCY07.005
	REAR COVER SILVER - RIGHT	60.SCY07.006
	LCD FRAME	33.SDB07.001
	BACK FRAME	33.SDB07.002
	FRAME RAM COVER	33.SCY07.003
	HINGE	60.SCY07.007
	ODD BRACKET	33.SCY07.004
	HDD BRACKET	33.SCY07.005
	MXM BRACKET	33.SCY07.006
	SPEAKER SET	23.SCY07.005
HEAT SINK		
	THERMAL MODULE - UMA/DIS	60.SDB07.006
	HEATSINK DIS	60.SDB07.007
	FAN UMA - RIGHT	23.SDB07.001
	FAN DIS - LEFT	23.SDB07.002

CATEGORY	ACER DESCRIPTION	ACER PART NO.
CPU/PROCESSOR		
	CPU Intel Core i5 750 LGA 2.66G 8M 1333 1156 95W B-1	KC.75001.CI5
	CPU Intel Core i7 860 LGA 2.8G 8M 1333 1156 95W B-1 Quad Core	KC.86001.CI7
	CPU Intel Core i7 870 LGA 2.93G 8M 1333 1156 95W B-1 Quad Core	KC.87001.CI7
	CPU Intel Core i3 530 LGA 2.93G 4M 1333 1156 73W C-2 Dual Core	KC.53001.CI3
	CPU Intel Core i3 540 LGA 3.06G 4M 1333 1156 73W C-2 Dual Core	KC.54001.CI3
	CPU Intel Core i5 650 LGA 3.2G 4M 1333 1156 C-2 73W, Dual Core	KC.65001.CI5
	CPU Intel Core i5 660 LGA 3.33G 4M 1333 1156 C-2 73W Dual Core	KC.66001.CI5
	CPU Intel Core i5 661 LGA 3.33G 4M 1333 1156 C-2 87W, Dual Core	KC.66101.CI5
	CPU Intel Core i5 670 LGA 3.46G 4M 1333 1156 C-2 73W, Dual Core	KC.67001.CI5
	CPU Intel Pentium Dual-Core G6950 LGA 2.8G 3M 1066 1156 C-2 73W	KC.69501.DEG
	HDD/HARD DISK DRIVE	
	HDD SEAGATE 3.5" 7200rpm 1000GB ST31000528AS(Pharaoh) SATA II 32MB LF F/W:CC44	KH.01K01.007
	HDD HGST 3.5" 7200rpm 1000GB HDT721010SLA360 Saturn SATA II 16MB LF F/W:31B	KH.01K07.002
	HDD HGST 3.5" 7200rpm 1000GB HDS721010CLA332 (Jupiter) SATA II 32MB LF F/W:3EA	KH.01K07.003
	HDD WD 3.5" 5400rpm 1000GB WD10EADS-22M2B0 (GP500) SATA II 32MB LF F/W:01.00A01	KH.01K08.005
	HDD WD 3.5" 5400rpm 2000GB WD20EADS-22R6B0 (GP500) SATA II 32MB LF F/W:01.00A01	KH.02K08.001
	HDD WD 3.5" 5400rpm 1500GB WD15EADS-22P8B0 (GP500) SATA 32MB LF F/W:01.00A01	KH.15K08.001
	HDD SEAGATE 3.5" 7200rpm 500GB ST3500418AS(Pharaoh) SATA II 16MB LF F/W:CC44	KH.50001.012
	HDD HGST 3.5" 7200rpm 500GB HDS721050CLA362 (Jupiter) SATA II 16MB LF F/W:3EA	KH.50007.012
	HDD WD 3.5" 7200rpm 500GB WD5000AAKS-22V1A0 SATA II 16MB LF F/W:05.01D05	KH.50008.014
	HDD HGST 3.5" 7200rpm 640GB HDT721064SLA360 Saturn SATA II 16MB LF F/W:31B	KH.64007.001
	HDD HGST 3.5" 7200rpm 640GB HDS721064CLA332 (Jupiter) SATA II 32MB LF F/W:3EA	KH.64007.002

CATEGORY	ACER DESCRIPTION	ACER PART NO.
KEYBOARD		
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver US with new color AC-MT-010	KB.RF403.245
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Traditional Chinese with new color AC-MT-010	KB.RF403.246
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Simplified Chinese with new color AC-MT-010	KB.RF403.247
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver US International with new color AC-MT-010	KB.RF403.248
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Arabic/ English with new color AC-MT-010	KB.RF403.249
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Thailand with new color AC-MT-010	KB.RF403.250
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Spanish with new color AC-MT-010	KB.RF403.251
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Portuguese with new color AC-MT-010	KB.RF403.252
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Canadian French with new color AC-MT-010	KB.RF403.253
	Keyboard CHICONY KG-0766 RF2.4 107KS Silver Brazilian Portuguese with new color AC-MT-010	KB.RF403.254
	Keyboard CHICONY KG-0766 RF2.4 109KS Silver Japanese with new color AC-MT-010	KB.RF403.255
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver German with new color AC-MT-010	KB.RF403.256
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Italian with new color AC-MT-010	KB.RF403.257
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver French with new color AC-MT-010	KB.RF403.258
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Swedish with new color AC-MT-010	KB.RF403.259
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver UK with new color AC-MT-010	KB.RF403.260
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Dutch with new color AC-MT-010	KB.RF403.261
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Swiss/G with new color AC-MT-010	KB.RF403.262
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Belgium with new color AC-MT-010	KB.RF403.263
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Icelandic with new color AC-MT-010	KB.RF403.264
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Norwegian with new color AC-MT-010	KB.RF403.265
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Hebrew with new color AC-MT-010	KB.RF403.266
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Slovenian with new color AC-MT-010	KB.RF403.267
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Slovak with new color AC-MT-010	KB.RF403.268

CATEGORY	ACER DESCRIPTION	ACER PART NO.
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Russian with new color AC-MT-010	KB.RF403.269
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Hungarian with new color AC-MT-010	KB.RF403.270
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Greek with new color AC-MT-010	KB.RF403.271
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Danish with new color AC-MT-010	KB.RF403.272
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Czech with new color AC-MT-010	KB.RF403.273
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Romanian with new color AC-MT-010	KB.RF403.274
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Turkish with new color AC-MT-010	KB.RF403.275
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Turkish-Q with new color AC-MT-010	KB.RF403.276
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Arabic/ French with new color AC-MT-010	KB.RF403.277
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Kazakh with new color AC-MT-010	KB.RF403.278
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Nordic with new color AC-MT-010	KB.RF403.280
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Spanish Latin with new color AC-MT-010	KB.RF403.281
	Keyboard CHICONY KG-0766 RF2.4 105KS Silver Polish with new color AC-MT-010	KB.RF403.282
	Keyboard CHICONY KG-0766 RF2.4 104KS Silver Turkmen with new color AC-MT-010	KB.RF403.279
MOUSE		
	Chicony wireless mouse RF2.4 MG-0766 with new colorAC-MT-010	MS.11200.063
	USB IR RECEIVER RG-0618U-995L	RV.11000.010
OPTICAL DRIVE		
	ODD PLDS Super-Multi DRIVE 12.7mm Slot DL 8X DL-8ATSH LF+HF W/O bezel SATA (HF + Win7)	KU.0080F.012
MAINBOARD		
	Mainboard Intel H57 Intel H57 H57 Proprietary W/O 1394 LF UMA version	MB.SC906.010
	Mainboard Intel H57 Intel H57 H57 Proprietary W/O 1394 LF	MB.SC906.007

CATEGORY	ACER DESCRIPTION	ACER PART NO.
MEMORY		
	Memory SAMSUNG UNB-DIMM DDRIII 1333 1GB M378B2873EH1-CH9 LF 128*8 0.055um	KN.1GB0B.030
	Memory UNIFOSA UNB-DIMM DDRIII 1333 1GB GU502203EP0201 LF 128*8 0.065um	KN.1GB0H.015
	Memory SAMSUNG UNB-DIMM DDRIII 1333 2GB M378B5673EH1-CH9 LF 128*8 0.055um	KN.2GB0B.014
	Memory UNIFOSA UNB-DIMM DDRIII 1333 2GB GU512303EP0202 LF 128*8 0.065um	KN.2GB0H.009
LCD PANEL W/TOUCH		
	LCD 23 IN. TQ2 TOUCH MODULE W/CONTROL BOARD - LPL FHD None Glare LM230WF1 TLA3	6K.SCY07.003
	LCD 23 IN. TQ2 TOUCH MODULE W/CONTROL BOARD - SAMSUNG FHD None Glare LTM230HT01 A03	6K.SCY07.004
POWER SUPPLY		
	PSU DELTA DPS-250AB-53A 250W Active PFC Custom "Open" Frame 100-127V/220-240V, EPA 5.0,	PY.25009.012
	PSU LITE-ON PS-5221-8AB 250W Active PFC Custom "Open" Frame 100-127V/220-240V, EPA 5.0	PY.2500B.005
REMOTE CONTROLLER		
	Philips Remote Controller RC2604307/01BG for EMEA;pair with RV.11000.007	RT.11300.021
	Philips Remote Controller RC2604302/01B MSFT code US;pair with OVU430008	RT.11300.022
	Philips Remote Controller RC2604301/01B MSFT code EMEA;pair with OVU430008	RT.11300.023
	SMK Remote Controller Japan RRS9003-3407EC Quatro Pulse	RT.11300.026
	Philips Remote Controller RC2604302/01B MSFT code US;pair with OVU430008	RT.11300.022
	Philips Remote Controller RC2604301/01B MSFT code EMEA;pair with OVU430008	RT.11300.023
	SMK Remote Controller Japan RRS9003-3407EC Quatro Pulse	RT.11300.026

Model Definition and Configuration

Test Compatible Components

This computer's compatibility is tested and verified by Acer's internal testing department. All of its system functions are tested under OS Linux, Windows® XP Home Edition, Windows® Vista, Windows® 7 Home Premium, Windows® 7 Professional, and Windows® 7 Starter.

Refer to the following lists for components, adapter cards, and peripherals which have passed these tests. Regarding configuration, combination and test procedures, please refer to the Aspire one series Compatibility Test Report released by the Acer Mobile System Testing Department.

Online Support Information

This section describes online technical support services available to help you repair your Acer Systems.

If you are a distributor, dealer, ASP or TPM, please refer your technical queries to your local Acer branch office. Acer Branch Offices and Regional Business Units may access our website. However some information sources will require a user i.d. and password. These can be obtained directly from Acer CSD Taiwan.

Acer's Website offers you convenient and valuable support resources whenever you need them.

In the Technical Information section you can download information on all of Acer's Notebook, Desktop and Server models including:

- Service guides for all models
- User's manuals
- Bios updates
- Software utilities
- Spare parts lists
- TABs (Technical Announcement Bulletin)

For these purposes, we have included an Acrobat File to facilitate the problem-free downloading of our technical material.

Also contained on this website are:

- Detailed information on Acer's International Traveler's Warranty (ITW)
- Returned material authorization procedures
- An overview of all the support services we offer, accompanied by a list of telephone, fax and email contacts for all your technical queries.

We are always looking for ways to optimize and improve our services, so if you have any suggestions or comments, please do not hesitate to communicate these to us.